ARMED FORCES CHEMICAL JOURNAL

IN THIS ISSUE—

Program, 13th Annual Meeting, A.F.C.A.

Atlantic City, N. J., June 5 and 6.

Press Bureau, Atlantic City, Photo

MAY-JUNE 1958

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POLICY

The fact that an article appears in this magazine does not indicate approval of the views expressed in it by any one other than the author. It is our policy to print articles on subjects of interest in order to stimulate thought and promote discussion; this regardless of the fact that some or all of the opinions advanced may be at variance with those held by the Armed Forces Chemical Association, National Officers, and the Editors. It is the responsibility of contributors, including advertisers, to obtain security clearance, as appropriate, of matter submitted for publication. Such clearance does not necessarily indicate indorsement of the material for factual accuracy or opinion by the clearing agency.

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Contributing Editors
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INDEX

ADVERTISERS

COVER PHOTO

As warm weather approaches, this picture may serve to remind members and their wives of the opportunity they have for a most interesting and pleasurable week-end in Atlantic City, N.J., June 5 and 6.

PICTURE CREDITS

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ARMED FORCES CHEMICAL ASSOCIATION

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WASHINGTON 6, D.C.

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The members of this Association, mindful of the vital importance to national defense of chemistry, allied sciences, and the arts derived from them, have joined together as a patriotic obligation to preserve the knowledge of, and interest in, national defense problems derived from wartime experience; to extend the knowledge of, and interest in, these problems; and to promote cooperative endeavor among its members, the Armed Services, and civilian organizations in applying science to the problems confronting the military services and other defense agencies, particularly, but not exclusively in fields related to chemical warfare. (From Art. II, AFCA Constitution.)

13th Annual Meeting

ARMED FORCES CHEMICAL ASSOCIATION

Hotel Traymore

Atlantic City

June 5-6, '58

TO GROUP MEMBERS OF AFCA

Gentlemen:

You have received your announcement of the AFCA 13th Annual Meeting to be held at the Hotel Traymore, Atlantic City, June 5-6 1958. The theme of this meeting is "THE ROLE OF THE ARMY IN MODERN WARFARE"; the Army being the host service this year.

There will be authoritative presentations by officers of the Army, Navy and Air Force in both Operations and Technical Services. You will be given an up-to-date appraisal of the status of their programs.

In addition, the Technical Services of the Army, Navy and Air Force will have elaborate and interesting exhibits appropriate to the theme of the meeting. These should be one of the highlights of our meeting.

Also—there is scheduled a luncheon, social hour and our famous banquet. The ladies, too, have an enjoyable program so plan to bring your wife. The weather is ideal at this time of year.

Looking forward to seeing you in Atlantic City.

Cordially,

Glenn A. Hutt

GLENN A. HUTT, President
ARMED FORCES CHEMICAL ASSOCIATION

13th ANNUAL MEETING

A PREVIEW

THE Committee in charge of arrangements for the 13th Annual Meeting of A.F.C.A., June 5 and 6, Hotel Traymore, Atlantic City, N. J., has set the stage for another outstanding program.

There are at least three excellent reasons for this view. First, is the adoption by the Committee of a highly important theme for this meeting, a subject which is not only of current interest, but indeed, one about which there has been a good deal of public discussion ever since World War II, namely," The Role of the Army in Modern Warfare." Second, is the provision of an impressive roster of speakers—most of them military officers—all of distinguished records and long experience, who now occupy positions of high responsibility. The third reason, of course, is the selection of gay, attractive Atlantic City, with its famous Boardwalk and superb beach front as the scene for this gathering for which the Army this year has accepted the role as "host service."

In focusing the program on the Army, the Committee followed the now long-standing practice of the Association to accent each year the Service which is providing special assistance and support for the meeting.

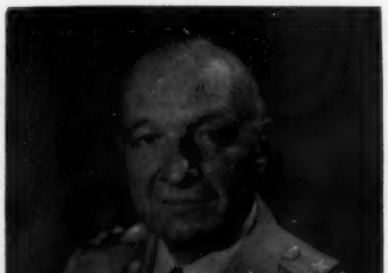
However, while the program this year will therefore consist mainly of presentations from and about the Army, it will not be confined to the Army. In fact, for the afternoon period of the first day, June 5, the theme has been broadened to encompass all three of the Armed Forces—Navy and Air Force as well as the Army. The presentations on June 5 will be provided by representatives of the Operations staff of each of the three. The speakers on the following day, June 6, will all be from the Army. These scheduled speakers, except for the banquet, are either the Chiefs, themselves, of the various Army Technical Services, or principal assistants.

General Trudeau, the Banquet Speaker

The Committee, which is headed by Dr. Wendell F. Jackson of Wilmington Chapter, National Vice-President for Meetings of the Association, is most pleased to announce the acceptance of its invitation to Lieutenant General Arthur G. Trudeau, the Army's new Chief of Research and Development, to be the guest speaker at the annual banquet on the evening of June 6. General Trudeau, who just recently returned from duty in the Far East, succeeded in his new post Lieutenant General James M. Gavin who retired on March 31.

The specific titles of the addresses by the various speakers on June 6 have not been announced, but it is believed the talks probably will deal to some extent with the special interests of the various Services in chemical developments and the chemical industry. However, there has been no desire or intention on the part of the Com-

(Continued on page 6)



THE BANQUET SPEAKER

Lt. Gen. Arthur G. Trudeau—Army's New R&D Chief

Lieutenant General Arthur G. Trudeau, who just recently assumed the duties of the Chief of Research and Development, Department of the Army, will be the guest speaker at the Banquet of the 13th Annual Meeting, A.F.C.A., Hotel Traymore, Atlantic City, June 6.

General Trudeau succeeded Lieutenant General James M. Gavin, who retired March 31, 1958.

General Trudeau is 55. A graduate of the U. S. Military Academy, he served in the European, North African, and Southwest Pacific theaters during World War II. He subsequently served as Assistant Chief of Staff for Intelligence, and as Division Commander in Japan and Korea.

In a recent interview, reported by Army News Service, General Trudeau warned against confining today's thinking to missiles and rockets. He noted that the field of research and development is extremely broad, covering all technical services, and not only weapons. Speaking of weapons of the future, he said that he felt conventional artillery is on the way out. General Trudeau emphasizes the human element in military preparedness. "The machine," he said, "will never become more important than man."

ARMED FORCES CHEMICAL ASSOCIATION
THIRTEENTH ANNUAL MEETING

Time: June 5 and 6, 1958
Place: Traymore Hotel, Atlantic City, New Jersey
Host Service: U. S. Army
Theme of Meeting: The Role of the Army in Modern Warfare

Program

Thursday, June 5

0900-1215 Registration (Traymore Room)

0900 Exhibits on display in Traymore Room

0900-1200 Coffee

1000-1200 Directors' Meeting (Mandarin Room)
Session Chairman: Glenn A. Hutt, President, AFCA
Theme: Role of the Armed Services in Modern Warfare

1330-1430 General Meeting of the Association (American Room)
Presentation of awards.

1430-1515 Address by Maj. Gen. J. E. Theimer,
Asst. Deputy Chief of Staff for Military Operations, Department of the Army.

1515-1530 Break.

1530-1615 Address by Vice Admiral Thos. S. Combs,
Deputy Chief for Naval Operations (Fleet Operations and Readiness)

1615-1700 Address by U. S. Air Force Speaker.

1800-1930 Reception and Cocktails (Traymore Room Gallery)

1930 Evening free.

Friday, June 6

(American Room)
Morning Session Chairman: President of the Wilmington Chapter

1000-1200 Presentations by the Army Technical Services
Chemical Corps—Maj. Gen. Wm. M. Creasy, Chief Chemical Officer.
Col. Ronald L. Martin, Deputy Commander Chemical Corps Research and Development Command.
Quartermaster Corps—Maj. Gen. A. T. McNamara, The Quartermaster General.
Mr. Charles N. Gardner, Chief, Development Branch, R & E Division, Office of the QMG.
Signal Corps—Brig. Gen. A. F. Cassevant,
Commandant, U. S. Army Signal Corps School.

1230-1330 Luncheon (Rose Room)
Lunchean for Ladies (Belvedere Room)

(American Room)
Afternoon Session Chairman: President of the New York Chapter

1400-1700 Presentations by the Technical Services
Ordnance Corps—Brig. Gen. John G. Shinkle, Deputy Commanding General Army Rocket and Guided Missile Agency, Huntsville, Ala.
Medical Corps—Maj. Gen. Silas B. Hays, The Surgeon General.
Col. J. R. Hall, Chief,
Occupational Health Branch of Preventive Medicine Division.
Transportation Corps—Brig. Gen. R. C. Tripp, Assistant Chief, Transportation Officer
Engineer Corps—Brig. Gen. J. L. Person, Asst. Chief Engineer for Civil Works.

1930- Banquet (Dress Optional)—Address by Lt. Gen. Arthur G. Trudeau, Chief, Research & Development, U. S. Army.

EXHIBITS BY THE ARMY TECHNICAL SERVICES, THE AIR FORCE AND THE NAVY ON DISPLAY IN THE TRAYMORE ROOM THROUGHOUT THE MEETING

13TH ANNUAL MEETING DATA

Registration: Advance Registration cheques should be sent to

Mr. Joel Henry
Finance Committee, A.F.C.A.
American Institute of Chemical Engineers
25 West 45th Street
New York, New York

Fees are as follows:

Registration ("Member or Guest")	$25.00
Registration Fee in case of Military or Civil Service personnel	$20.00
Registration Fee for Ladies	$15.00

(The Fee in each case covers Reception, Thursday, June 5, Luncheon and Banquet, June 6)

Hotel Accommodations:

In view of the demand for hotel space, it is urged that members reserve hotel accommodations in advance. In the case of the Traymore, prices for single rooms with bath range from $8.00 up; for double occupancy, room with bath $10.00 up; Suites are from $25.00 up.

How to Get to Atlantic City:

Transportation to and from Atlantic City is available by airline, railroad and/or bus. Between New York and Washington, D. C. and Atlantic City, there are four air flights each way daily; from Philadelphia there are two air flights and one return flight; railroad facilities include 15 trains a day between Penn Station in New York and Atlantic City—time about 3 hrs., and 7 trains a day from Philadelphia—trip about 1½ hrs.; bus-line service provides up to 20 trips a day from Port Authority Bus Terminal in New York—trip time 2½ hrs., and 20 trips a day from Union Terminal, Philadelphia—trip time 2 hrs. There are also 3 to 5 trips a day from Wilmington, Delaware—time 3 hrs.

13TH ANNUAL MEETING

(Continued from page 4)

mittee to limit the program to chemical matters. Indeed, Dr. Jackson, in discussing the meeting theme in his recent letter to the membership about the program, stated:

"This is a timely subject in these days of rapid change in technology. The change is reflected not only in weapons systems and equipment, but also has a profound influence on strategic planning. Most of us who are associated with a particular facet of defense know the current situation in a limited area, but here is an opportunity to get an up-to-date appraisal of the broad picture by high-ranking military authorities in both Operations and Technical Services."

For this meeting it seems certain that the audience will be much interested in knowing something of the professional background and personality of the speakers. Brief biographical sketches and photographs of the speakers in order of appearance are, therefore, included in this pre-view of the meeting.

Extensive Military Exhibits

Extensive exhibits by the various Services represented at the meeting will be on display at the Hotel. Mr. Henry Marsh of Wilmington Chapter heads the Exhibit Committee, and the project officer for that part of the program is Colonel Theodore P. Gahan, Chemical Officer Headquarters First Army, Governors Island, New York.

The entire program will be unclassified.

The Committee in charge decided upon a "package" registration fee, which will cover the Reception and Cocktail Party on June 5, and the Luncheon, Reception and Banquet on June 6. Members may bring guests. For the banquet the wearing of evening dress is optional. Advance registration is urged by the Committee and members who plan on coming are especially advised to reserve hotel accommodations in advance.

For ladies attending there will be a special luncheon on June 6 and provisions for bridge will be made. Assuming fine weather, which can well be expected, the Committee felt that the ladies attending will probably prefer spending much of their time outdoors enjoying the sea breeze and sights on the Boardwalk and waterfront to some indoor entertainment program.

All of the general meetings of the two-day session will be held in the American Room of the Traymore. The closed meeting of the Board of Directors, scheduled for 10:00 A. M. June 5, will be held in the Mandarin Room. It will include the annual election of officers the results of which will be announced at the general business meeting of the Association in the American Room, starting at 2:30 P. M. June 5.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ANNUAL MEETING SPEAKERS

Biographical sketches of the speakers, in the order of their appearance on the program, follow. All meetings will be held in the American Room, Hotel Traymore.

Thursday, June 5—Afternoon Session, 2 P.M.

MAJOR GENERAL JOHN ELLIOT THEIMER, USA, Assistant Deputy Chief of Staff for Operations, Department of the Army.

General Theimer, born November 12, 1904, in Owatonna, Minnesota, was commissioned in the Field Artillery and assigned to the 18th Field Artillery Regiment at Fort Sill, Oklahoma, on graduation from West Point in June 1929 His entire service before World War II, and a good deal of it since, has been in the artillery. In 1943 he assumed command of the 695th Armored Field Artillery Battalion, which he took to Europe in 1944. Subsequently he became executive officer of the 90th Division Artillery, and later was named commanding officer of the Fifth Artillery Group. He participated in the Normandy, Northern France, Ardennes-Alsace, Rhineland, and Central Europe campaigns. Following return to this country, he served at the Field Artillery School as a gunnery instructor. He attended both the Armed Forces Staff College and the National War College.

In December 1952 General Theimer took command of the 9th Infantry Division Artillery in Germany.

Returning to the United States again in 1955, he became Assistant Commandant of the Artillery & Guided Missile School, Fort Sill, and in 1956 was assigned to the office of the Deputy Chief of Staff for Military Operations.

General Theimer was promoted to the grade of Brigadier-General in 1953, and to Major-General in 1956. His decorations include the Legion of Merit, the Silver Star, the Bronze Star Medal, the Air Medal, and the Purple Heart.

VICE ADMIRAL THOMAS SELBY COMBS, USN, Deputy Chief of Naval Operations (Fleet Operations and Readiness) Department of the Navy.

Admiral Combs' distinguished career includes service as a Naval Aviator; Aircraft Carrier Commander in operations in the Pacific in World War II; and, since the war, various positions of high responsibility, including Fleet Commander.

Admiral Combs was born at Lamar, Missouri, in 1898. He entered the Naval Academy in 1916, played football there and was Company Commander in the Brigade of Midshipmen. In 1918, in World War I, he had service on the USS Kansas on escort duty. He was designated a Naval Aviator in 1922. In World War II he participated in the Aleutian Islands Campaign, later went to the Southwest Pacific where he held a number of air assignments, including Commander Fleet Air Wing TEN, and, (briefly) Commander Fleet Air Wing SEVENTEEN.

Returning to the United States in 1944, he took command two months later of the carrier YORKTOWN, proceeded again to the Far East and participated in operations from Okinawa south to Formosa, strikes in the Philippines, landings on Luzon, and strikes on Tokyo Bay and Okinawa. During the latter months of the war he served as Chief of Staff and Aide to Commander SEVENTH Fleet.

For his World War II service Admiral Combs received the Distinguished Service Medal, the Silver Star, the Legion of Merit with Oak Leaf Cluster, Commendation Ribbon with Star and Combat "V," and the Presidential Unit Citation Ribbon.

Returning to the Navy Department in 1946, Admiral Combs served first as Assistant Chief of the Bureau of Aeronautics for Material and Services, and in May 1951 he became Chief of that Bureau. This period also included duty afloat in command of Carrier Division ONE and as Chief of Staff and Aide to the Commander-in-Chief, Atlantic Fleet.

During the period 1953 to 1955, when he returned to the Navy Department as Deputy Chief of Naval Operations, Admiral Combs served as Commander of both the SECOND and the SIXTH Fleets. First made a Rear Admiral in 1945, he was promoted to Vice Admiral in 1953.

At the time of going to press the name of the officer to make the Air Force presentation during the June 5 part of the program had not been received. This unavoidable delay was occasioned by the necessity of withdrawing the name of the officer previously designated as the speaker by reason of a change in his duty assignment, making it impractical for him to attend the meeting. The Association is assured, of course, of fully representative participation by the Air Force.

Friday, June 6—Morning Session, 10:00 A.M.

MAJOR GENERAL WILLIAM M. CREASY, Chief Chemical Officer, Department of the Army.

General Creasy is well known to members of the Association, having been Chief of the Corps, and Honorary President of the Association during the past four years. His assignment as Chief Chemical Officer has just recently been extended for two years.

General Creasy, born in Wilmington, North Carolina, in 1905, graduated from the United States Military Academy in 1926, and was com-

missioned initially in the Air Service. In 1927 he transferred to the Field Artillery, and in 1929 he transferred to the Chemical Warfare Service (since redesignated Chemical Corps).

General Creasy has a degree of Master of Science in Chemical Engineering Practice from the Massachusetts Institute of Technology. He is a graduate of the Command and General Staff School of the Army, and the Army and Navy Staff College.

During the World War II period, General Creasy served as Chief of the Engineering Division, and was officer-in-charge of technical design during the construction of Pine Bluff Arsenal, Arkansas. Later he was transferred to the China-Burma-India theater of operations where he served first as Assistant Chief of Staff for Plans of the U. S. Armed Forces there, and after that as Chief of the U. S. Plans Section of the Allied Forces in Southeast Asia.

General Creasy's post-War II assignments have included duty in the Research and Development Division of the War Department General Staff, Chief of Research and Development Division of the Chemical Corps, and Commander of Army Chemical Center. He was made Chief Chemical Officer of the Army on May 8, 1954.

General Creasy has received the Distinguished Service Medal, the Legion of Merit, the Bronze Star Medal, and the Army Commendation Ribbon.

COLONEL RONALD L. MARTIN, Deputy Commander, Chemical Corps Research and Development Command.

Colonel Martin, born in Batesville, Indiana, in 1910, is a graduate of the United States Military Academy, West Point, and has a Master's degree in Business Administration from the University of Pennsylvania. He is also a graduate of the Field Artillery School, the Command and General Staff College, and the Industrial College of the Armed Forces.

Colonel Martin served six years in the Field Artillery before transferring to the Chemical Corps in 1943.

During World War II, Colonel Martin organized, activated and then commanded the 92nd Chemical Mortar Battalion throughout its extensive service in France, Belgium, and Germany. His service since the war has included duty in Hawaii and Germany, the office of the Chief Chemical Officer, as instructor at the Chemical Corps School, and Commanding Officer of Edgewood Arsenal.

He has been awarded the Legion of Merit, the Bronze Star Medal with Oak Leaf Cluster, and also has a Parachutist Badge.

MAJOR GENERAL ANDREW THOMAS McNAMARA, The Quartermaster General, Department of the Army.

General McNamara, born in East Providence, Rhode Island, in 1905, was graduated from the Military Academy in 1928 and commissioned in the Infantry. Following various Infantry assignments, he attended the Quartermaster Subsistence School, graduated in 1935, and transferred to that Corps in 1937.

During World War II General McNamara became Assistant Quartermaster of the II Corps while it was in England. In 1942 he was appointed Quartermaster and moved with that Corps to the North African theater. Later he became Quartermaster of the First Army in the European Theater of Operations, serving in that capacity until 1945. Service in the office of the Quartermaster General of the Army, the General Staff, and the Office of the Under Secretary of the Army followed. In 1946 he returned to Europe as Assistant Chief-of-Staff, G-4, U. S. Army Europe, and in 1957 was confirmed as Quartermaster General of the Army.

He has the Distinguished Service Medal, the Legion of Merit, the Bronze Star Medal, the Army Commendation Ribbon, and various foreign decorations.

MR. C. N. GARDNER, Chief of the Development Branch of Research and Engineering Division, Office of the Quartermaster General, Department of the Army.

Mr. Gardner, born Dec. 4, 1914, in Brooklyn, N. Y., attended Polytechnic Institute, Brooklyn, and Pratt Institute. He served as an officer in World War II on Ordnance research and development duty at Aberdeen Proving Ground, Maryland. Following the war he was engaged with a firm of consulting chemists specializing in synthetic resins and plastic components. He joined the staff of the Quartermaster General's office in 1949.

BRIGADIER GENERAL ALBERT FREDERICK CASSEVANT, Commandant U. S. Signal Corps School at Fort Monmouth, N. J.

Born in Biddleford, Maine, in 1908, General Cassevant was graduated from the Military Academy in 1927 and commissioned in the Coast Artillery Corps. He served in that Branch in various capacities, including overseas duty, until August 1937, when an assignment to Fort Monmouth marked a change in his career. He was assigned to the Signal Corps

Engineering Laboratories as antiaircraft liaison officer and radar project officer. Further antiaircraft assignments elsewhere followed, but, in 1943 he returned to Monmouth, detailed in the Signal Corps, as Director of the Evans Laboratory of the Signal Corps Engineering Laboratories. A series of Signal Corps assignments followed, and, in May 1945, he went to the Asiatic-Pacific Theater for temporary duty.

He returned to the Engineering Laboratories in 1946, and in 1947 transferred from Coast Artillery Corps to the Signal Corps. General Cassevant again had overseas service, as Signal Officer of the Army Forces Far East, with headquarters in Tokyo, during the period 1954-1955.

He has been awarded the Legion of Merit, the Army Commendation Ribbon with Metal Pendant, and a number of other decorations and citations.

Friday, June 6—Afternoon Session, 2:00 P.M.

BRIGADIER GENERAL JOHN G. SHINKLE, Commander, Army Rocket and Guided Missile Agency at Redstone Arsenal, Huntsville, Alabama.

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General Shinkle, a graduate of West Point 1933, served several years in the Field Artillery before obtaining a detail in the Ordnance Corps, in which branch he has served continuously since. He has a Master's degree awarded him by Massachusetts Institute of Technology 1939. During much of the war period he served on various assignments in connection with development and testing of munitions at Aberdeen Proving Ground, including testing of aircraft bombs, fuses and associated equipment, armor plate and armor-piercing munitions. In 1944, following a short detail in the G-4 Division of the War Department General Staff, he was sent to China where he served as Deputy G-4 on the staff of the theater commander. He later was detailed to the executive headquarters of the Marshall Mission. His subsequent assignments, following return to the United States, include that of Commander of the San Francisco Ordnance District, as Ordnance Member of the Joint Brazil-U. S. Military Commission at Rio de Janeiro, Brazil; Director of Technical Operations at White Sands Proving Ground, New Mexico; Executive Officer for the Assistant Chief of Ordnance for Research and Development.

General Shinkle was promoted to the grade of Brigadier General in July 1956. His awards include the Legion of Merit, and the Army Commendation Ribbon with Metal Pendant.

"Our Nation's accomplishments in recent years in adapting the triumphs of the laboratory to military use have permitted us to develop the greatest peacetime strength in the history of our country," reports the *Army Information Digest,* for May 1958.

"No victory is assured," General Omar N. Bradley once said, "until the man on the ground takes possession by his physical presence on the enemy's soil."

MAJOR GENERAL SILAS B. HAYS, the Surgeon General of the Army, Department of the Army.

General Hays, who was born in St. Paul, Minnesota, in 1902, attended Iowa State College and later, the University of Iowa where he received a Bachelor of Science degree in 1925 and Doctor of Medicine degree in 1928.

Entering the Medical Reserve Corps upon graduation, General Hays was immediately assigned to active duty, obtained a regular commission as First Lieutenant of the Medical Corps in 1929 and since then has continued in the active medical service of the Army.

General Hays has supplemented his extensive career in surgery with studies and duties in medical supply work. In February 1944 he was sent to Europe to study medical supply problems, and, in the following May, became Chief of the Supply Division in the office of the Chief Surgeon, European theater.

General Hays, following the war, served in Hawaii and Japan, returning to the United States in 1951 to become Deputy Surgeon General. He was made Surgeon General of the Army in 1955.

General Hays' decorations include the Legion of Merit with two Oak Leaf Clusters. In 1945 he received a decoration from the French Government and was named "Officer de l'Ordre de La Sante Publique."

COLONEL JOHN R. HALL, Chief, Occupational Health Branch of Preventive Medicine Division, Office of the Surgeon General.

Colonel Hall, a native of Napton, Missouri, has a B.A. degree from Central College, Fayette, Missouri, a B.S. degree from the University of Nebraska and a degree in Medicine from Washington University, St. Louis, Missouri. He also received a degree as Master of Science in Pharmacology from the University of Chicago in 1949, and Master of Public Health from Johns Hopkins University in 1955.

Colonel Hall served in the Far East as surgeon of the 1st Cavalry Division during the war period, 1942 to 1945, and as surgeon of X Corps from 1945 to 1946. He was made assistant surgeon and Chief of Preventive Medicine of the U. S. Army in the Caribbean in 1950.

He has been awarded the Silver Star, the Legion of Merit, the Bronze Star Medal with two Oak Leaf Clusters and "V," the Air Medal, the Purple Heart, and the Combat Medical Badge.

Electronic coordinating and directing systems, such as the missile master for air defense, increase by at least ten times the tactical capabilities of the Army's missiles as compared with what they could accomplish through unaided human coordination.

BRIGADIER GENERAL ROBERT CAMPBELL TRIPP, Assistant Chief of Transportation (Military Operations), Office of the Chief of Transportation, Department of the Army.

General Tripp, born in North Vernon, Indiana in 1911, was graduated from the United States Military Academy in 1933. Initially he was commissioned in the Corps of Engineers. He furthered his technical education by attending Massachusetts Institute of Technology where he received a Master's degree in Civil Engineering in 1936. He has served as Assistant to the District Engineer, Washington Engineer District, Washington, D. C.

During the early period of World War II he was serving as instructor in the Physics Department at West Point. In 1943 he left that assignment for the European Theater of Operations. He served successively both in England and France in connection with Movements. As Transportation Officer of the Advance Section, Communications Zone, ETO, in charge of water, rail, and motor transportation supporting the 12th Army Group, he was credited with putting into operation the famed "Red Ball Express," which, in the 81 days of its service, carried some 400,000 tons of critical supplies at round-trip distances of 400 to 750 miles, supporting the First and Third Armies.

General Tripp's decorations include the Legion of Merit and various foreign orders and medals.

BRIGADIER GENERAL JOHN L. PERSON, Assistant Chief Engineer for Civil Works, Office of the Chief of Engineers, Department of the Army.

General Person was born in Attleboro, Massachusetts in 1907. A graduate of the United States Military Academy, he supplemented that education with attendance at Massachusetts Institute of Technology from 1931 to 1932; the Technische Hochschule of Berlin, 1938-39, and the National War College 1947-48. He is a Registered Professional Engineer of the State of Kentucky.

General Person has held a variety of important engineering assignments, including duty with the U. S. Waterways Experiment Station, Vicksburg, Mississippi, and as Assistant Engineer Commissioner, District of Columbia.

During World War II, he served in the ETO, including duty as Commanding Officer, Military Pipeline Service; as Deputy Chief Engineer of the Theater; and Engineer of the Western Base Section. He has served since the war as District Engineer of the Louisville District; commander of 20th Engineer Brigade at Ft. Leonard Wood, Mo.; Engineer of the U. S. Forces in Austria, and Division Engineer, Ohio River Division, with headquarters in Cincinnati.

General Person has been awarded the Legion of Merit with Oak Leaf Cluster, and various foreign honors and medals.

THE ROLE OF CHEMISTRY IN NATIONAL DEFENSE

By

Brig. Gen. Harold Walmsley

Commanding General, Army Chemical Center, Md.

Address delivered before a joint meeting of the Cincinnati Chapters of the Armed Forces Chemical Association and the American Chemical Society in Cincinnati, Ohio, April 9, 1958.

I was asked to tell you tonight about the role that chemistry plays in national defense.

I wish that I could tell you all the ways in which national defense depends upon chemistry, but you wouldn't have the time to listen and I wouldn't be able to stand here long enough to tell you, for the reason that chemistry plays a role in nearly every facet of the development of the many millions of items required for our armed forces. Not one single modern weapons system, and each weapons system is comprised of an infinite number of items, could function without the products of the chemical industry.

Chemistry has figured largely in the evolution of the modern military aircraft, the atomic submarine, and the fire power of the Army. It is no less important to the Armed Forces than it is to you in your daily lives.

I recently came upon a quotation which described chemistry as "the most sensual and exciting of sciences. Even in its modern austerity, a chemical laboratory is the most fascinating place in the world to those lucky enough to possess strong curiosity and sense of smell."

The excitement cannot be denied, but the author of that statement omitted an important adjective—NECESSARY. The economy, the standard of living and the very existence of this nation depend upon chemistry.

The monetary value of the chemical industry ranks fifth in the United States. In first place is transportation equipment, which could not operate without the fuels developed by the chemist. Second place is occupied by food and kindred products—with the chemistry supplying, among other things, the means of preserving foods. Third place is held by machinery, other than electrical. Again, chemistry supplies the lubrication necessary for its operation. Just barely in fourth place is the primary metal industry which depends upon metallurgy, a descendant of chemistry which is an offspring of the first of all physical sciences, alchemy.

And so, although statistics place the chemistry industry in fifth place financially, a little research shows that chemistry is the prime factor permitting the very existence of larger allied industries.

These facts are important not only to the civilian economy, but in like degree to the military economy. The mobility of our armed forces, the weapons they use, the food they eat, their health and comfort, and the clothes they wear depend upon the achievements of the chemical industry.

The Departments of the Army, Navy, and Air Force rely heavily upon chemists, as demonstrated by the fact that they employ many thousands of them. In the Army you will find chemists in nearly all of the technical services working on an infinite variety of vital problems. In the Army Chemical Corps, which is the largest employer of chemists in the entire Army, they are working with chemicals which are not used to contribute to the functioning of weapons, but are the weapons themselves.

The Army has in the neighborhood of sixty research and development installations and facilities of various types scattered around the country. I suspect that if a careful study were made of their activities we would find chemistry entering into some phase of their work in almost every instance. In some places chemistry may occupy a minor part of the total program and in others it is a major part of the research effort.

While the name—Chemical Corps—would connote that our work is devoted exclusively to chemistry, actually, purely chemical activity is only one part of our program. We are concerned primarily with the application of chemistry in the development of munitions systems and production.

Both the Quartermaster Corps and the Ordnance Corps have major programs in the field of chemical re-

search and development. For example, the Chemical and Plastics Division of the Quartermaster Research and Development Center at Natick, Mass., in cooperation with industry, is concerned with a wide variety of products designed for the protection, comfort, and improvement of the efficiency of troops. Examples are fungicides, rodenticides, flash burn creams, chemical heating devices, and many other items.

The Ordnance Corps is actually the largest user of chemicals in the Army. It is concerned with the use of chemicals in such things as propellants and explosives, cleaning and preserving compounds, fuels and lubricants. Chemicals figure largely in many of the special products with which Ordnance is concerned. As an example, a non-metallic mine may contain a wide range of components made of polystyrene, phenolic resins, and epoxy adhesives. Pyrotechnic devices may contain polyester resins, epoxy resins, polyethylene, and nitrile rubber.

Guided missiles, which are now very much in the public eye, may contain a whole range of chemical compounds. An ordinary artillery shell may be composed of such things as polyethylene, phenolic resin, cellulose acetate, butyrate and others.

We find chemical products in our vehicles, and all of our weapons and weapons systems, and propellants; in many types of paints and protective coating for equipment.

I could go on at great length in all the ways in which the Army and the entire defense establishment depend upon chemcial products and the ingenuity of chemical laboratories both in the military departments, in industry and our academic institutions. I could extend this even further by examining the many ways in which the chemical industry has been given impetus by the demands of defense. Just since the Korean war, many new technological frontiers have been crossed both by the chemical industry and the military services. The industry has not only created new products for new uses, but by its ingenuity, spurred by the demands of defense needs, has found many substitutes for foreign products. This serves to decrease our dependence upon other nations in time of war when our supply lines become uncertain.

New frontiers are ahead of us in chemistry. The search for propellants to power our missiles is pointing the way to greater fuels. Man's mind now seems to be set upon the conquest of outer space. If we succeed in propelling ourselves out among the stars we must have propellants of far greater power than we perhaps can now imagine. We are rapidly catching up with Buck Rogers, who solved the problem of space travel many years ago. There is an old saying that Man can do anything that he has power to imagine that he can do. We seem to be keeping pace with our imagination.

Much of our progress in the chemical field has stemmed from the close working relationship between scientists in our military laboratories, and those in industrial and academic laboratories. In order to obtain the greatest results, it obviously would be impossible as well as unsound economics for all Army research projects to be conducted in Army installations and by Army employees. Consequently it is the policy to take the fullest advantage of the great variety of skills, knowledge and facilities existing outside the military establishment. This is done by assigning projects under contract to commercial organizations, research foundations and educational institutions.

The Army Chemical Corps has depended heavily upon industrial firms and universities for much of its research. We have received a great deal of voluntary advice and suggestions from industrial and academic scientists. This has materially aided in the development of ideas and equipment. We are now receiving material assistance from the chemical industry in our search for new chemical warfare agents.

In order to provide the machinery for the systematic search for and collection of information from industries and universities concerning chemicals and processes which may have an application in our work, we have established an industrial liaison program in the Chemical Warfare Laboratories at the Army Chemical Center. In this program the aid of industry is being enlisted in our efforts to find new chemical compounds, processes and information which may be used in our research work on chemical warfare agents, as well as information of value to other research programs of the Army Chemical Corps.

General areas of interest in the program include such things as compounds of a highly lethal nature and those having marked convulsant, sedative or incapacitating action. In the same general category are compounds which will produce physiological effects so unpleasant that troops will be unable to carry out their assigned duties and will have to seek immediate protection.

Another group, about which the Chemical Corps is seeking information from industry, includes compounds which have therapeutic or prophylactic value counteracting the effect of chemical warfare agents.

The Corps also is interested in substances, compounds, or mixtures which have specialized properties such as: gelling, thickening, incendiary, decontaminating, smoke producing. Another group includes information concerning detection of chemical warfare agents and nuclear radiation, and the protection and decontamination of personnel or material exposed to their effects.

Now in our files is information concerning over 2,000

chemical formulae, suggestions and ideas, representing millions of dollars worth of research that the chemical industry has submitted to us. At present more than 300 of the nation's 3,000 industrial laboratories are cooperating in varying degrees with the program. Some companies are submitting monthly lists of newly prepared compounds, along with as much biological data as they have available. Others are opening their chemical and biological files to Chemical Corps representatives. We hope in time to broaden this program to include the majority of the nation's industrial laboratories.

There is another side of the relationship of chemistry to national defense about which too little has been told. This is somewhat of a reverse relationship in that it has to do with the many benefits which have accrued to our daily lives as a result of the development of weapons of war. This applies entirely across the board in the military establishment. We enjoy many benefits today which may have had their inception in research on war gases, in the development of submarines, explosives, aircraft, cures for disease, and on into nearly every facet of military research and development.

From the earliest times, the Army has contributed to the economic and industrial life of the nation, above and beyond the primary purpose of providing for national defense. This contribution has grown through the years and will continue to multiply on an ever-widening basis in a multitude of fields, returning dividends to the taxpayer on his original investment in national security.

Some of these contributions are direct, tangible and measurable, although it would be next to impossible to arrive at any hard and fast figures. Others are indirect, intangible, but nevertheless real. Some have been incidental by-products to military developments. Others have been the results of planned cooperation with industry.

While the primary concern of the Army is that of national defense, it is still true that it very frequently produces inventions or processes which are quickly picked up by industry. In many instances these would not have been developed by industry because of the lack of an existing commercial demand, but once in existence and adapted to civilian needs they have found ready markets and have filled needs which may have existed but were not recognized.

In many cases the Army today is underwriting civilian research and development directed primarily at developing industrial or manufacturing processes which actually will have primary effects on the civilian economy before they can be utilized by the military.

Frequently wartime necessity may lead the Army to develop or invent something that has widespread civilian impact. Such a war-spurred contribution was the research that led to the discovery of an acceptable substitute for quinine.

American troops, faced with the rigors of fighting in steaming jungles during World War II, had to be protected against the ravages of malaria, yet the natural sources of quinine were in enemy hands. Army medical researchers came up with several substitutes, which finally led to prima-quinine, a drug which actually cures the disease, rather than merely alleviating the symptoms.

The idea that missile research would benefit victims of tuberculosis might at first appear extremely far-fetched. Yet when medical researchers discovered a few years ago that TB responds to treatment with the chemical known as hydrazine, it developed that the chemical was available in large quantities only through the Army Ordnance Corps. This was for the reason that hydrazine was developed as a fuel for missiles. Had it not been for military necessity, it might never have been produced.

In the Army Chemical Corps alone, the contributions to human welfare resulting from our research in the chemical and biological fields numbers in the hundreds and are growing every day.

On every drug store counter you will find a wide variety of items in spray cans, ranging from insecticides to hair spray and shaving soap. The packaging of items in these cans has become a large industry which owes its development to research carried out during World War II in the production of aerosol insecticides for the Armed Forces. The insecticide aerosol made it possible for our Armed Forces to campaign and live in insect infested areas.

Spray dispensers have developed into a major business. About 185 million units were filled in 1955 by 105 firms for a 190 million dollar business. More than 300 products are now packaged in spray cans under 500 brands.

Paradoxically, in some instances the knowledge gained from research into the means of killing our enemies can assist in saving lives. Such is the case with our research on war gases. The medical laboratories at the Army Chemical Center have shown that investigation into nerve gas defense may contribute to the treatment of agricultural and chemical industry workers exposed accidentally to lethal doses of some of the newer types of insecticides. On several occasions members of the laboratories have been called into consultation on the treatment of patients exposed to commercial insecticides.

Scientists found that both the insecticides and the gas, which are closely related, can cause chemical reactions in the body which paralyze nerve centers, among them the centers which control breathing. Chemical Corps studies revealed, however, that even lethal-sized dosages are not necessarily fatal when artificial respiration and an antidote such as atropine are promptly given as soon as the symptoms of nausea are noticed.

Work in Army Chemical Corps laboratories and in universities led to the discovery that a compound similar to nerve gas, known as DFP, is useful in relieving the pressure that occurs in eyeballs of people afflicted with glaucoma, a disease which often leads to blindness.

The same compound has proved effective in overcoming partial paralysis of the bladder and the intestines that may occur in patients following operations and those having debilitating diseases that confine them to bed.

A chronic, fatal disease, myasthenia gravis, that is characterized by muscle weakness, has frequently been alleviated by the use of a compound having a long technical name, but known briefly as TEPP, and related materials.

The interest of the Chemical Corps in controlling convulsions that may result from nerve gas poisoning has resulted in the screening of a large number of drugs, old and new, which may also prove effective in alleviating epileptic convulsions.

Studies of the action of nitrogen mustards which are war gases, have led to their use in the treatment of the leukemias, Hodgkin's disease, and lymphosarcoma. All are fatal forms of cancer. The nitrogen mustards also were tested clinically in various types of cancer of the lungs. The nitrogen mustards probably do not cure any form of cancer, but they do prolong life in many instances and bring about remarkable remissions of the disease in others.

Early in World War II intensive investigations were undertaken both in the United States and the United Kingdom to find antidotes to the toxic action of Lewisite,

a potent war gas containing arsenic. Widespread studies based on the experimental work at Army Chemical Center have shown that a compound known as BAL is effective in the treatment of poisonings by antimony, arsenic, bismuth, cadmium, chromium, cobalt, gold, mercury and nickel.

The end result is that research started in connection with Chemical Corps problems has supplied a method of treatment of great value in preventing death from metals like arsenic and mercury, which have been employed fairly widely for homicidal and suicidal purposes, and from other metals like antimony, cadmium, and chromium which may be causative of poisonings in industry.

Anthrax is a disease of domestic animals of considerable economic importance. It occasionally affects man, especially those handling animal products such as in the wool and tanning industry. Heretofore, the only vaccine of reasonable value for use in animals has been a live spore vaccine developed by Louis Pasteur. There is some danger in the use of this vaccine since it contains live spores. It cannot be used in man.

During and after the war, scientists of the Chemical Corps and colleagues in England developed an entirely new vaccine. It is a soluble antigen containing no live material and is the first vaccine that is safe for use in man. For this development, one of our scientists received the Army's highest award given to civilians, "The Exceptional Civilian Service Award."

The Chemical Corps was instrumental in developing a poisonous paint now widely used for coating the exterior of ocean-going vessels to control growth of marine organisms such as barnacles. This has meant incalculable savings to the shipping industry.

The Corps, in cooperation with other agencies, developed the widely used DDT and other insecticides. It has also aided in developing rodenticides, and has contributed knowledge of considerable value in the control of plant diseases such as wheat rust and rice blast.

The Chemical Corps began early studies of reinforced plastics, multiwall sacks, and of overpacks to serve as suitable substitutes for glass carboys. As a result, the chemical industry has had available better materials and techniques for packaging dangerous chemical materials for shipping. Chemical Corps experience in the handling and manufacture of toxic materials has been of considerable assistance to chemical companies confronted with similar problems.

As with other Army technical services, the Corps does not and cannot work in a vacuum. It maintains close relationships with manufacturers and users of chemical products, and new developments by one quickly affect the other. Very frequently, the Corps is able to carry on research and experimentation that no single commercial firm can do, with resulting benefit to the entire industry. Development of insect repellants, for example, is one area that led to wide civilian application. At present, the Chemical Corps is engaged in research into insect responses to certain odors. This already has provided a basis for knowledge affecting repellancy (and attractions as well) so that insect poisons can be made more effective. The result should be repellants that will offer much greater protection for humans and animals.

The commercial flame throwers now in use in agriculture are a direct outgrowth of items developed by the Army Chemical Corps. These include small knapsack types and tractor-drawn flame throwers that are mounted on cultivators to kill weeds in crop rows. These are widely used for burning thorns on cactus to make the plant fit for animal consumption; for controlling weeds in fields, and for aquatic weeds.

These are only a few of the great many instances in which Army research efforts have resulted in contributions of incalculable value to human welfare and better living.

In the Chemical Corps alone, significant contributions to scientific knowledge cover a large and varied area including the fields of bacteriology, embroyology, epidemiology, pathology, botany, chemistry, biochemistry, physiology, and many other sciences.

The results of our research are made known where possible to the scientific fraternity through publication in a large number of specialized journals. The size of these contributions may best be emphasized by the fact that as many as 600 scientific articles by Chemical Corps scientists have been published in a single year.

There is no earthly way by which dollar value may be placed on these contributions to better living which have resulted from military research and development. While we certainly cannot prove it, it has been estimated that in many cases these by-products have a value well above the total cost of the program from which it originated. I would not want to imply by any means, however, that all military expense is justified by these contributions to human welfare. This would be an extreme fallacy, as the generation of such contributions is not the purpose of military research and development. This is for the purpose of providing the munitions, equipment and material necessary for national defense.

It is gratifying, however, that while engaging in our main job, we are able at the same time to assist in making this world a better place in which to live.

The focus of the "technical manpower" problem, long a concern of A.F.C.A., seems to have shifted considerably from the question of numbers of engineering graduates and their proper utilization in industry and defense, to one of quality. Perhaps never before has there been so much public concern about the adequacy of our educational system, particularly at the high-school level.

Among recent noteworthy discussions on this subject, and one that has provoked a good deal of comment, was an address by Admiral Rickover, father of the atomic-powered submarine, during a preparatory school anniversary celebration in Washington, D. C. Admiral Rickover sees an increasing need for improved education if present high living standards in this country are to be maintained.—Editor.

EUROPEAN AND AMERICAN SECONDARY SCHOOLS—A COMPARISON

By

Rear Admiral H. G. Rickover, USN

Chief, Naval Reactors Branch

U. S. Atomic Energy Commission

and

Assistant Chief of the Bureau of Ships for Nuclear Propulsion

(Address Delivered at Fiftieth Anniversary Celebration, St. Albans School, Washington, D. C., March 23, 1958)

I am delighted to speak here on a subject which I find as absorbing as my work in atomic energy. Indeed, I find the two so intertwined that I would have had to be most unobservant not to have gotten myself involved with American education.

In my constant search for competent people to work in the nuclear power program I was inevitably driven to the conclusion that something is radically wrong with our educational system. I have given this much thought and I believe it is possible to pinpoint *where* educational inadequacy causes a bottleneck and *why* this is so.

The specialized education offered in American colleges and universities for future professionals is—with some significant exceptions—pretty good. But professional education in America is severely handicapped by the weakness of our public elementary and secondary education. Traditionally, 12 years of schooling were thought sufficient to enable students to read and to write correctly, to obtain a solid foundation in history, geography, mathematics and the sciences, and to acquire competence in reading at least one foreign language. Upon this foundation, the professional schools then built programs of about 4 years' duration, designed to equip an already broadly educated young man or woman with the vast fund of specialized knowledge required by a modern professional person.

Now if the underpinning is weak two things must happen: either the future professional must lengthen his period of schooling by 2 to 4 years in a liberal arts college, so that he may acquire sufficient general knowledge to perform his professional duties in a wise and socially responsible manner; or his course of professional study itself has to be overloaded with remedial courses—as in English or mathematics—and with hastily concocted general humanities courses to patch up the gaps in his pre-professional schooling.

In the first case, the time required to attain professional standing is lengthened beyond what is tolerable to many talented young people—they simply will not wait that long to establish themselves and become economically independent. Moreover, the need to attend college before starting professional school is costly for the student as well as for the college. Tuition alone runs to about $1,000-$1,500 annually but this is only half what it costs the college to educate the student.

In the second case—where professional schools attempt to make up for previous educational deficiencies—the student has a heavy work-load and achieves only a most sketchy sort of liberal education. For engineers, the first 2 years of professional school lean heavily to basic courses in mathematics and sciences—in addition, many freshmen must take remedial courses. The result is that too much of the engineering course has to be squeezed into the last 2 years. The study load then becomes too burdensome—about 60 hours a week of classroom, laboratory and homework for 4 long years. Such cramming is not the best preparation for a profession.

The chronic shortage of good scientists, engineers and other professionals which plagues us is the result of inadequate pre-professional education—of time wasted in public school which somehow must be made up later on.

But, is is said, our public education must concern itself more with the average student who does not wish

to become a doctor, lawyer or engineer. For these average students the situation is, if anything, worse. They must depend for competence in dealing with life's problems on what they have learned in the 12 years from age 6 to 18.

Now this is the time in a youngster's life when he can most easily absorb large numbers of facts and when his curiosity can most readily be stimulated to want to do so. This is the time when young minds should be filled to capacity with impressions; when they should be stretched to their maximum. Only the school can do this. It can do it for children of most varied natural endowments, if it frankly recognizes these variations and devises curricula tailored to the capacities of the talented, the average, and the below-average child. Each group can then develop best at its own rate of speed. For each the same basic process of storing the mind with knowledge can be adapted.

Since the *above-average* pupil is 2 to 3 years ahead of the *average* pupil in mental age, he can complete the curriculum in a shorter period, or he can absorb more academic subjects or study them more deeply. But the same type of mental food which the above average pupil needs is needed also by the less gifted. Even the *below-average* child who may be 2 to 3 years behind the average in mental age and whose maximum capacity may be limited to the 6th grade—even he ought to be taught the same basic course of study given in the first six elementary years, though at a much slower rate. It may take him until 15 or 16 to complete the 6th grade. But if he can be motivated to want to, he can at least be taught the 3 R's.

For all children, the educational process must be one of collecting factual knowledge to the limit of their absorptive capacity. Recreation, manual or clerical training, etiquette and similar know-how have little effect on the mind itself and it is with the mind that the school must solely concern itself. The poorer a child's natural endowments, the more does he need to have his mind trained.

We should not have to support schools if we want no more than "adjustment" of children to life as it *is*. Children learn this in simpler societies just by "living" and by the incidental training they receive from the grown-ups around them. A child is being properly educated only when he is learning to become independent of his parents. We have schools because we know that in today's world everyone is daily called upon to make decisions for which he needs a background of general knowledge, not obtainable merely by "learning through living." To acquire such knowledge, fact upon fact, takes time and effort. Nothing can really make it "fun." If we try to spare our children mental effort and to protect them against disappointments or personal failures through flunking exams, we send them ill prepared into a competitive world. This is most dangerous in a democracy for, as Jefferson warned us: "If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and never will be." Note the qualification "in a state of civilization." Formal school education was not as vitally needed in American pioneer society as it is in 20th Century America. The degree of ignorance which a democracy can tolerate varies in inverse ratio to the advance of the nation toward higher cultural and scientific levels.

OUR elementary and secondary education must, thus, provide first, for the average and below average student, a sufficiently broad terminal education to fit him into a modern technological society; and second, for the talented student, it must provide a solid underpinning for subsequent professional education. Neither of these two objectives is achieved in the majority of American public school systems. Unlike all other Western countries of similar civilization, we lack a national standard for curricula, for school leaving examinations, for diplomas, or for teacher qualifications. There is a wide variety in the school systems of different states, even for different cities in the same state. We have some excellent school systems but many more poor ones.

Why do most of our public schools fail in the objectives I have mentioned? Basically, I think, because today these two purposes are *not* the objectives of our schools. We are reaping the consequences of the destruction of traditional education by the Dewey-Kilpatrick experimentalist philosophy. While we have fortunately been spared wide application of progressive teaching methods in the schools themselves—thanks primarily to the heroic resistance and good judgment of our teachers—the spirit of Dewey permeates our teacher colleges and our state boards of education. It makes its pernicious influence felt in the steady deterioration of secondary school curricula, the overlong prolongation of elementary schooling, and the denial to teachers of professional status.

We must give credit to Dewey and his followers for having improved what once was altogether too autocratic a relationship between teacher and pupil, and for bringing a relaxed and friendly atmosphere into our classrooms. But we must also, on his own pragmatic terms, reject Dewey's claim that experimentalist education "adjusts" the child to life in a changing society such as ours, and that it does this better than traditional education.

Dewey's desire to alter curricula so as to teach subjects which will be of use to the child in life can be accepted only *if* we interpret the term "use" in its broadest sense. Unfortunately, his ideas have led to elimination of many academic subjects on the ground that they would not be "useful" in life, and to substitution of trivial, recreational, and vocational subjects alleged to be of more practical value. The student thus receives neither intellectual training nor the factual knowledge which will help him to understand the world he lives in, or to make well-reasoned decisions in his private life or as a responsible citizen in a modern democracy. He is instead handed a bag of "know-how tricks"; he is helped to become a pleasant, nicely mannered young person, able to get along with whatever group he joins. Even for the average pupil, these subjects are not mentally stimulating—they barely touch his mind.

Our schools once had the important task of Americanizing large numbers of children whose parents arrived here from diverse cultures, and whose first need was to "adjust" themselves to a new country. This the schools have done magnificently. But today, ours is a pretty homogeneous country, a country where the majority no longer live in poverty, where most families consider themselves middle-class and enjoy a material standard of living much higher than that of the middle-classes of the past. Traditionally, training of children in manners, appearance, poise, and consideration for others has been a distinctive function of the middle-class family. Nowhere have the schools to which middle-class children go been expected to take over this function which belongs to the home. Formal school education has always and everywhere been concerned solely with development of mental powers, with due attention also being given to physical exercise for purposes of safeguarding the pupil's health.

Intellectual training can be combined with home train-

ing only when schools are residential—as are the famed English "public" schools. In a short school day there is not enough time to do both. I suggest we turn back to the home what is properly the function of the home and permit the public schools to concentrate on what is properly their function—the education of young minds.

To that end, we must break the experimentalist hold on curricula and teacher certification. Pedagogy is an important skill in a teacher's professional equipment but it is less important than thorough and deep knowledge of subject matter. Teacher colleges are now almost totally given over to pedagogy, school administration and psychology. Teaching cannot become a true profession until, like all professions, it demands of its practitioners that they pursue a lengthy course of study in the special field of their choice. You cannot make of "pedagogy" as such or of "school administration" as such a field of academic study comparable to law or medicine. They are in a sense the minors in a professional course of study; the major must always be the specific subject to be later taught—a teacher must be a true scholar in his own field. His scholarship will, of course, differ depending on whether he teaches history, let us say, in elementary or secondary school, or in college. Different degrees of depth and breadth of knowledge will be required; also different methods of presenting the subject to the pupil.

Today, our teachers are, in effect, denied the opportunity to make themselves such scholars, because their right to teach and their professional advancement are tied to required courses in pedagogy which few of them would choose, if they were given the freedom to plan their own course of study. Teachers do not have unlimited time to complete their professional training. If they are forced to waste much of it on pedagogical trivia, they have that much less time for serious study, and the losers are our children, of course.

Dewey's denial of absolute values; his insistence that learning leading to growth must be based on the experience of the child; and that the aims of education must be to modify behavior rather than to impart knowledge—all this gives American education a transitory flavor, ties it closely to the society into which the child is to be fitted. It also provides an effective smoke screen preventing comparison of American education with that of countries having similar ways of life. Indeed, we have long lived in educational isolation and it is time we look around and see what is being done in other countries.

To get the necessary data is quite difficult—there seems to be no agency in the United States collecting such information. Through the great kindness of Mr. Philippe F. Scholten, a graduate of the University of Leyden now residing at Middlebury, Connecticut, I have been able to obtain considerable data on education in the Netherlands. The Dutch system resembles that of most European countries. Education in the various countries of Europe has always been surprisingly uniform in standards and even in the details of school curricula—the unifying factor being the traditional demand of European students to have access to the universities throughout the continent. The universities themselves have always had fairly uniform standards. These go back to the unity of Europe in the Middle Ages under a Universal Church which was the educator of the people.

In Holland, all education from kindergarten to university is almost entirely financed by the government. The 6-year elementary school is free; the secondary schools charge small fees which are adjusted to family finances. University fees average about $75.00 per year.

After completing the 6-year elementary school at age 12, the Dutch child can enter one of six types of secondary schools. Entrance to these schools depends almost exclusively on the aptitude of the child as determined by examinations, but there is flexibility which permits later switchover from one type of school to another.

Three of these secondary schools are *non-academic* types:

(1) The trade school which lasts 4 years and which compares favorably with our vocational high school;

(2) The advanced elementary school which also lasts 4 years and which offers a program about the same as the average American high school;

(3) And finally, the secondary school Type "A" which lasts 5 years and may be compared to our better public high schools.

In addition to these three *non-academic* secondary schools there are also three *academic* secondary schools. One, the secondary school Type "B," lasts 5 years. Its graduates are qualified to study medicine and technical subjects at institutions of university rank, but not law or theology. The second one is the Latin-grammar school, Type "A" which emphasizes the humanities; the third one is the Latin-grammar school, Type "B" which emphasizes science and mathematics. Both of these Latin-grammar schools last 6 years and their graduates may study any subject at the universities. All three of these academic secondary schools terminate with a long and comprehensive government-supervised examination covering the entire school program and lasting several days. And there are no multiple-choice questions.

I have made some calculations to compare the curricula of the Dutch secondary schools with our own 6-year junior-senior high schools. The Dutch school day is 10% longer than ours; the school week lasts 6 days or 20% longer; the school year lasts 240 days or 33% longer. The Dutch class period is 50 minutes and the homework required is a minimum of 4 hours daily. Further, no subjects but academic ones are taught, except gym, art, and music.

I have also tried to make a comparison of the credit points required in our secondary schools with those of the Dutch secondary schools. As far as I can determine, the student must take 16 points of solid academic subjects in the last 4 years of our junior-senior high schools, or 4 points per year. And these 16 points are all that are required to enter college. If we were to give equal weight to the first 2 years of our junior-senior high schools, the student ends up with a total of 24 credit points in academic subjects for 6 years. The Dutch student ends up with 30 credit points for the 5-year school. And for the 6-year school, he ends up with 40 points, or 66% more than we.

To give you an idea of how these credits are obtained, let me run down the figures for these two types of Dutch schools:

First, the 5-year school: 4½ points for the mother tongue (Dutch); 10½ points for three modern languages: French, English, and German; 3 points for history and political science; 4 points for economics and accounting; geography 2½ points; mathematics 3 points; physics, chemistry, and biology 3 points. I think you will agree that by the end of his 16th year the Dutch student at a 5-year school such as this is at least as well versed in basic subjects as the American high school graduate a year later. Even so, he will not be admitted to a university since he is really not considered to be an "educated" person!

(Continued on page 20)

EUROPEAN AND AMERICAN SCHOOLS

(Continued from page 18)

Now as to the 6-year academic Latin-grammar school. Let us take Type "B," the one which specializes in mathematics and science, since it is closer to American education than the purely classical one. The mother tongue (Dutch) 4 points; the usual three modern languages 8½ points, Latin and Greek 11 points; history 3 points; geography 2 points; mathematics 5½ points; physics, chemistry, and biology 6 points.

Europe has always demanded more of her children than we of ours, and for a very good reason. To attain a high standard of living, given a similar level of technology, a country must either have a favorable ratio of people to land and resources, or its people must work harder and more intelligently—they must acquire more competence. In other words, poverty of land and of natural resources can be offset to a degree by better development of human resources. Ours has been the classical example of a high standard of living based primarily on favorable ratio of people to land but in the last 180 years we have wasted much of our natural wealth and multiplied our population more than 40 times. Though our ratio of people to land is still much better than that of Europe, it worsens each year and the day is not too far off when we shall be no better off in that respect than Europe. We must not let ourselves be impressed by total acreage figures. There is much desert and semi-arid land in our West whereas Europe has carefully preserved its land and forests and has no deserts or arid lands.

As we approach European conditions, we may find that we shall have to make a choice: educate our children better or downgrade our standard of living. We still have a margin of safety but it is none too soon for all of us to think this matter over carefully so that we may express our wishes clearly and in the proper democratic way to those who run our schools.

Few of us have been aware of our worsening situation, for thus far science has been able to keep up with diminishing resources and a population growing 3 times as fast as Western Europe's. If we develop all our human resources, we shall still be able to insure a high standard of living to our children and grandchildren. But it cannot be done with 180-day school years, driver training courses and print shop in high school.

All along the line we are paying for neglect of secondary education in mathematics and science, yes, but also in English, history and geography. To maintain scientific and technological leadership and the modicum of culture necessary in a civilized society, we must get to work on the long-range task of reorganizing our public schools so that they may give us the kind of people needed today where few problems can be solved by common sense and hard physical work alone, but where the need above all is for well equipped minds, "adjusted" to this scientific era in man's history.

DR. FRANCES M. LATTERELL

FT. DETRICK PLANT PATHOLOGIST HONORED FOR HER OUTSTANDING WORK ON RICE BLAST DISEASE

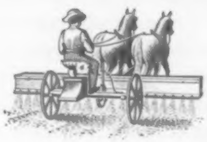
Dr. Frances M. Latterell, an Army Chemical Corps plant pathologist at Fort Detrick, Md., was presented with the Meritorious Civilian Service Award of the Department of the Army by Major General William M. Creasy, Army Chief Chemical Officer, in a ceremony February 4, in his office at Gravelly Point, Va.

The award to Dr. Latterell was in recognition of her outstanding work with rice blast disease. Her demonstration of the existence of several physiological races of the fungus causing rice blast has been hailed as a contribution of significant importance to the rice pathologists and rice breeders throughout the world. Prior to Dr. Latterell's work, it had not been firmly recognized that there were physiologically characterized and distinct races of the blast fungus capable of attacking specific varieties of rice. It has been stated that Dr. Latterell's discovery should go a long way toward reducing the serious effects of rice blast on a food item of basic importance in the diet of much of the world's population.

In addition to this honor, Dr. Latterell has received the 1957 Fort Detrick Research Society of America (RESA) award, and a $300 cash award for special services from Fort Detrick.

Dr. Latterell served as a Research Associate at Iowa State College where she received her Ph.D. Born in Kansas City, Mo., she attended Kansas City, Mo., Junior College, and the University of Kansas City.

Easy-to-apply Shell Chemical insecticides give dependable control.



THE "CRISIS" IN AMERICAN SCIENCE

Excerpts from Article under this title in the Winter 1958 issue of The American Petroleum Institute Quarterly

By Eugene Ayres

(The crux of the American problem in today's technological race is not more "run-of-mine" scientific scholars or engineers but rather a need for young men of "creative aptitude" or "inventiveness," states Mr. Ayres, distinguished chemist, author, and inventor, particularly in the field of peroleum. The following excerpts from his article are presented here, by permission, as matter of interest to Journal readers.—Ed.)

. . . It is well known that the capacity of United States technologists in the realm of scientific creativity has been relatively low. All we have to do is to survey the things that are of fundamental importance to our industrial way of life for us to find that nearly all of them were cenceived by non-Americans.

We have been scooped many times by England, France, Italy, Germany, and several other nations. Familiar examples of things conceived abroad are: the steam engine, steam motor car, steam locomotive, diesel engine, internal-combustion engine, carburetor and distributor, electric generator, steam turbine, wireless communication, steel and aluminum manufacture, X-rays, radioactivity, catalysis, and many, many, other things. Indeed, hundreds of important industrial processes and devices now in use here were invented abroad. The most recent (as of this writing) and spectacular of these is the earth satellite. We should have become adjusted to the idea of other nations registering scientific "firsts," but, instead, to most of us the Russian success was a "rude shock."

The reason, of course, is that all of us are aware of the satellite, with its dramatic military implications. . . . But now we are awakening to the danger of too great dependence upon the inventiveness of other nations. We can thank the sputnik for this.

We are unexcelled, of course, in our capacity to develop ideas already conceived. . . .

. . . We hear much debate on the merits of "basic" and "applied" research, but there is little agreement as to the definition of terms. Yet definition is not important if what we really need is more creative originality. Much so-called basic research is merely the collection of physical measurements. This, while it is essential to progress, is quite as unimaginative an occupation as the application of formulae by an engineer. In both theory and practice the "break-through" is accomplished by inventiveness.

Here I am using the word "inventiveness" in its broadest sense. In this sense (creative originality) Albert Einstein was probably the greatest inventor of all time, but James Watt was a close second. Yet the one had to do only with abstractions, while the other was concerned only with material ideas. A run-of-mine scientific scholar has no more inventiveness than a competent engineer. What we need is the scholar who can escape from the grooves of accepted theoretical knowledge and the engineer who can escape from his handbooks of formulae. For the development either of the theory or of the practice of ideas already conceived we need only run-of-mine scholars and engineers, but for the conception of new ideas in theory or practice we need inventors. That we already have plenty of good men for development is attested by our extraordinary success in development in all American scientific fields. That we have too few inventors is realized, I believe, by every thoughtful student of current American technology.

Some of the characteristics of the inventor are obvious. He is a nonconformist, a poor organization man, and he cooperates grudgingly. Other less obvious characteristics are that he is inexperienced, usually under 35 years of age, and is likely to know less about his field of technology than many of his noninventive contemporaries. Some of these qualities deserve comment.

The efficient development of ideas already conceived requires organization. Many talents must be brought together under wise administration. The inventor, however, is not likely to fit into The Team. His attention strays from the predetermined path and his influence is likely to be distracting to others. In our highly organized groups of technologists we have created a wonderful tool for development, but we must remember that without the inventor the group will have less and less to cooperate about. Sometimes we forget this truism and spend (especially in government) fantastic sums of money on obsolescent ideas. A place must be made for the inventor, not in an organization (where he is a misfit) but in honored isolation with only the assistance he desires.

To exaggerate a little, a comparison may be made with an organized body of competent musicians comprising a symphony orchestra under an able conductor. But the composer is the inventor of the symphony. A television drama must have a producer, a director, various minor executives, a host of technicians, and, above all, talented actors. These people must all work together in harmony. But the author is the inventor of the drama. Without the *composer* and the *author* the rest would have nothing to cooperate about. We try to teach young people to compose and to write and to paint pictures, but we have made no specific attempt to teach technical invention in theory or in practice.

What sort of instruction should be given to the potential inventor? This is a problem that merits serious study. We know that certain things should *not* be done. With all the publicity that has been given to Russian thoroughness in scientific education, we are tempted to imitate. I believe that this is the wrong approach for inventors, who are temperamentally unfitted for the crammed acquisition of scientific knowledge. Too much conventional learning dulls the imagination, though it makes admirable scholars or engineers. Perhaps a little clue to Russia's success in the nurture of scientific genius is that

she does not provide her children with toy airplane kits with diagrams for the assembly of parts. The raw materials are supplied, and the children, under supervision, are urged to use their ingenuity in the design of their own airplane toys. Whether the model works or does not work measures the creativeness or the randomness of their originality.

How can we test the young for creative aptitude? This is a most difficult problem, for creativeness does not go along with accepted measures of the "intelligence quotient." But surely, with so much at stake, the problem can be solved.

We must remember that invention, even in technology, is an art rather than a science. It differs, however, from all other arts in that the early spark of technical genius soon expires. Inventions are sometimes made by men over 35, but these inventions are nearly always of little importance. An old man can improve on his youthful genius in painting, sculpture, music or writing, but not in technology. Invention differs from any other technological activity in that it is not improved by experience or academic proficiency.

Our national Department of Defense is headed up by men with a proven genius for organization. It will function smoothly and effectively, but if it "cooperates" to a technically successful end it will probably be following an inspired blueprint devised by an enthusiastic youngster.

The most progressive research and development departments of the petroleum industry are giving much thought to these social and pedagogic problems. They are trying to discover inventive aptitude among their youngest technical employees and are offering salary inducements to promising men to stay *out* of the various organized technical groups. This is not easy, because it takes a man in his early years out of the direct lines of advancement. After the young man has completed ten of 15 years under such a program he usually will have "shot his bolt," insofar as creative originality is concerned. What is the best thing, then, for him and for his company? There is, as yet, no clear answer. The company—and especially the employee—is taking serious risks. However, if a man likes the idea of a preliminary inventive episode in his career, and if he has confidence in his own capacities, he is sometimes willing to take the risk. But he must be given sufficient compensation in his early years of employment.

One thing the petroleum industry might undertake to advantage is an attempt to influence our universities to lay stress not only on scientific scholarship, but also on scientific imagination. Glowing descriptions of the tremendous pace of technological advancement in this country (or in the world) over the last few decades have had an unfortunately tranquilizing effect on the young scientist. The true picture of relative stagnation is obscured by a panoply of modern gadgets. He is not told, for example, that while the motor car of today has remarkable qualities of performance and convenience it is, after all, only the consummation of Nineteenth-century ideas. We have seen half a century of competent mechanical development and of great improvement in fuels, but of only minor invention. The motor car still has about the lowest power efficiency of any machine.

Since 1900 we have graudally improved the amount of power from a ton of coal through the development of our power plants, but the big advances came before 1900. Since then, inventions in this field have been minor. We have been approaching a dead end in the efficiency of power production because no inventor has come along to eliminate the wasteful steam cycle in the conversion of heat to power. Even present nuclear-power plants are curious mixtures of the most modern nuclear devices with relatively ancient steam turbines and generators.

The young student should be told what great inventive challenges lie ahead of him in the basic areas of our industrial life. In particular he should be told how important it is to sustain the mobility of our people. Nothing, in fact, is more important, and yet we all know that the world's supply of liquid fuel is not inexhaustible. It matters little whether the pinch is imminent or remote. The essential thing is for us to shake off our inventive lethargy in time to avoid a gap of one or more decades be-between liquid fuel mechanization and some other (perhaps nuclear) mechanization. Nothing can be gained by lulling the potential inventor to sleep or by diverting him from this basic need to more glamorous fields.

The problem of discovery, encouragement, training and utilization of young inventors cannot be solved overnight. But this problem, in my opinion, is the crucial one to be solved in our economic and military competition with Russia.

NEW SURVEY DEVICE

A lightweight electronic distance measuring device designed to eliminate the laborious and time-consuming taping method used in surveying is under test by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va.

Called the Tellurometer, the device consists of a master and a remote or "slave" station set up at opposite ends of the line to be measured.

Tests have indicated that using the instrument, measurements up to 40 miles can be made in one-tenth the time, and with fewer personnel than required by the conventional taping method.

CHAPTERS IN CHEMICAL WARFARE

IV THE VELVET-LINED GAS MASK OF JOHN STENHOUSE

By **Wyndham D. Miles**

U. S. Army Chemical Corps Historical Office

THE FIRST gas masks were devised more than a century ago. They were intended for industrial, medical and military purposes. So far as chemical warfare is concerned, this was sixty years before gases were used in battle.

As is the case with many inventions, the idea did not occur to one man alone. During the 19th century several persons conceived the idea of a mask that would fit over the mouth and nostrils and remove unpleasant or harmful materials from inhaled air.

One of the most interesting masks was that devised by the Scotsman John Stenhouse in the 1850's. Stenhouse was a first-class scientist, in contrast to inventors who came up with Rube Goldberg ideas, and his mask, of which apparently a number were made, seems to have been quite practical.

Stenhouse's mask evolved from his investigations carried on around 1850 on the absorptive power of plain and activated charcoal. The scope of his work is indicated by the titles of a few of his articles, "On the Economical Applications of Charcoal to Sanitary Purposes," "On Platinised Charcoal," and "On Decolorizing Charcoals and Their Power of Absorbing Some of the Gases," all published between 1854 and 1858.

Chemists before this time had been aware of charcoal's power of removing odors from the air. An example frequently found in early 19th Century texts is that of a thin layer of charcoal strewn over a piece of decaying meat would prevent unpleasant odors from arising. Stenhouse went a step further and found that charcoal would remove chlorine, hydrogen sulphide, and ammonia from air.

Being interested in the practical applications of chemistry (he held patents in dyeing, waterproofing, tanning, and production of sugar), Stenhouse saw several possible uses for his discovery. A mask filled with charcoal, for example, would protect house-painters from vapors that arose from paint solvents, gunners in casemated batteries from gases of exploding powder, and travelers in unhealthy regions from miasmas (Stenhouse lived in the days when people thought that particles of infectious matter, called miasmas, floating in the air, caused disease).

He designed two masks, apparently quite similar, one of which is pictured here. In the mask powdered wood charcoal filled the space between two hemispheres of wire gauze. The frame of the mask was copper, but the edges were of soft lead and were lined with velvet to allow the mask to be molded tightly to the face. The upper supporting band was elastic while the lower band tied behind the head. Exhausted charcoal could be removed and be replaced by fresh charcoal through a small door in the wire gauze.

Woodcut of Stenhouse's mask.

From Edward L. Youmans' **Class-Book of Chemistry**, New York, 1858.

STENHOUSE exhibited his "charcoal air-filter" for the first time at a meeting of the Society of Arts in 1854. He did not patent the idea, but gave it to the public. Some manufacturer evidently saw commercial possibilities in the mask, judging from the statement made by George Wilson, professor of technology at the University of Edinburgh: "Certain of the large chemical manufacturers in London are now supplying their workmen with the charcoal respirators as a protection against the more irri-

This is the fourth of a series of short historical articles by Dr. Miles. The next article will be published in an early issue.—Ed.

tating vapors to which they are exposed." Wilson also commented on another possible industrial use for the mask: "Many deaths have occurred among those employed to explore the large drains and sewers of London from exposure to sulphuretted hydrogen, etc. It may be asserted with confidence that fatal results from exposure to the drainage gases will cease as soon as the respirator is brought into use." However, the most startling statement by Wilson concerned the possible military use of the mask in chemical warfare: "The longing for a short and decisive war has led to the invention of a suffocating bombshell; which on bursting, spreads far and wide an irrespirable or poisonous vapor; one of the liquids proposed for this shell is the strongest ammonia, and against this it is believed that the charcoal respirator may defend our soldiers. As likely to serve this end, it is at present before the Board of Ordnance."

Along with the mask for protecting an individual, Stenhouse invented a device to purify air entering rooms. It was a sandwich made up of two sheets of wire gauze, filled with charcoal. This device was used, according to Stenhouse, to deodorize the air entering several government offices: "One of these air-filters, or charcoal ventilators, was erected more than three months ago in the justice-room, at the Mansion-House. This apartment, from the position of several nuisances in the very narrow street from which it is ventilated, was usually so offensive as to have become the subject of general complaint. Since the erection of the charcoal ventilator, through which all the air entering the apartment is made to pass, all the impurities are absorbed, and the atmosphere of the air has been made unexceptionable. From the success attending on the charcoal ventilator at the Mansion-House, the city authorities have fitted up the justice-room at Guildhall with a similar apparatus, which is giving equal satisfaction." Stenhouse's air filter sounds very much like our modern collective protectors, and it acted, from Stenhouse's description, in much the same fashion.

Stenhouse was born in Glasgow, Scotland on October 31, 1809. He was twenty-five years old when he turned to chemistry, and this came about because of the growing dependence of his father's business, calico-printing, upon chemistry. After he started to study chemistry, the science caught him up and never let go. In Glasgow he attended the lectures of Thomas Graham, the father of colloid chemistry, and Thomas Thompson, the great historian of chemistry. Then he went off to Giessen, Germany, to learn the technique of practical chemistry in the laboratory of Justus von Liebig.

IN 1839 a Glasgow bank failed, carrying down with it the fortune left Stenhouse by his father. Through his investigations in industrial chemistry, however, Stenhouse built up a modest fortune of his own. His specialty, like that of many other chemists of his time, was organic chemistry. He published more than one hundred papers in British, German, and French scientific journals. He was the first to synthesize trichloronitromethane, which he christened Chloropicrin in his articles in Liebig's *Annalen* 66, 241-247 (1848). He noted the obnoxious properties of chloropicrin, but it remained for the Russians in 1916 to turn the compound to the purposes of war.

In 1865 the British government appointed Stenhouse one of the assayers of the Royal Mint, and in 1871 the Royal Society presented him with a medal for his researches in chemistry. During the last four years of his life, he suffered from an eye ailment that forced him to live in a darkened room. He died on December 31, 1880.

In this series of articles we have already mentioned Lyon Playfair, Thomas Cochrane, Forrest Shepherd, John Doughty, and other men, all of whom suggested that chemicals be used in warfare. John Stenhouse represents the other side of the coin, a chemist who provided a method for protecting soldiers against poison gases in battle.

Bibliographical note:

A biographical sketch of Stenhouse is in the **Journal of the Chemical Society**, 39, 185-88 (1881). His description of his charcoal ventilator for purifying the air entering rooms is from his article, "On the Economical Application of Charcoal to Sanitary Purposes," **Royal Institution of Great Britain, Proceedings**, 2, 53-55 (1854-58). George Wilson's statements are from **Transactions of the Royal Scottish Society of Arts** 4, Appendix 0, 198 (1854).

DR. WM. A. LALANDE, JR., HONORED

The annual award of the Philadelphia chapter of Alpha Chi Sigma, national professional chemical fraternity, was presented recently to Dr. William A. LaLande, Jr., Vice President, Pennsalt Chemicals Corporation. Dr. LaLande, a member of A.F.C.A., was honored for "his outstanding services to the community, the chemical industry, and the profession" as a teacher, chemist and administrator.

Presentation of a framed scroll recounting his work during the past 30 years was made during the organization's monthly meeting. A series of skits depicting highlights of Dr. LaLande's career preceded the presentation, which was viewed by approximately 100 leading chemists and chemical engineers of the Delaware Valley.

CHEMICAL CORPS NEWS

GEN. CREASY'S APPOINTMENT IS EXTENDED FOR TWO YEARS

In general orders No. 10, dated 19 March 1958, the Chemical Corps announced the extension, by direction of the President, of the appointment of Major General William M. Creasy as Chief Chemical Officer, United States Army, for two years, effective May 7, 1958.

WOMEN'S ARMY CORPS DIRECTOR VISITS ARMY CHEMICAL CENTER

EDGEWOOD, MD.—Women's Army Corps Director, Colonel Mary Louise Milligan, shown in picture above with Brigadier General Harold Walmsley, post commander,

recently made her annual staff visit to this post. Colonel Milligan visited the many facilities of the post where WAC personnel are assigned and observed them performing their duties. Members of the Women's Army Corps are utilized in the research, development and materiel program being conducted here.

CHIEF OF CHAPLAINS DEDICATES NEW CHAPEL AT FORT McCLELLAN

FORT McCLELLAN, ALA., March 1—Major General Patrick J. Ryan (second from left), Colonel John M. Palmer (third from left), Major John F. Orzel (right) and Captain Ralph R. Arms (left), are pictured during the recent dedication of the "Centurion" Chapel at Fort McClellan Alabama.

General Ryan, Chief of U. S. Army Chaplains, gave the dedicatory address and Colonel Palmer, commanding officer of the U. S. Chemical Corps Training Command, also spoke during the program. Major Orzel, post Catholic Chaplain, and 100th Chemical Group Chaplain Cap-

tain Arms helped plan and also participated in the ceremony.

The beautiful new chapel, built at a cost of $196,000, overlooks the Chemical Corps parade field, and is currently being used by Catholic, Protestant, and Jewish faiths.

ARMY SMALL BUSINESS ADVISER SPEAKS AT CHEMICAL CENTER

Mr. Jack W. Askins small business adviser to the Assistant Secretary of the Army (Logistics), was guest speaker at a recent Chemical Corps Small Business Conference at the Army Chemical Center, Maryland. The conference, held at Materiel Command, was called to review the Chemical Corps small business program and discuss ways and means of effecting maximum utilization of small business concerns in the operation and accomplishment of the Chemical Corps' mission.

From 1942-1946 Mr. Askins served with the Armed Forces as a field grade officer. After the war, he was consultant and sales engineer for small manufacturing firms specializing in items of equipment for the oil and gas industry. He became a Federal employe in 1951.

In addition to post personnel, the conference was attended by representatives from other Chemical Corps installations.

STORM RESCUE WORK OF ARMY CHEMICAL CENTER

EDGEWOOD, MD.—Now that the blizzard of '58 is a thing of the past and the Army Chemical Center has gone back to routine operations, Centerites can look back with pride at the assistance given by so many individuals who are to be commended for the aid they rendered to both the post and nearby communities in clearing enormous drifts of

snow, ministering to the sick, and taking food to isolated families and troops.

The post helicopter flew on mercy missions which ranged from bringing supplies, to evacuating snowbound persons in need of immediate medical care.

On one of the flights to take food to isolated NIKE units, both Post Commander, Brigadier General Harold Walmsley, and Colonel Raymond B. Firehock, commanding officer of the 17th Antiaircraft Group, accompanied the crew.

In a race against time, the crew rescued a woman stricken with hemorrhage and took her to the Havre de Grace hospital for blood transfusions. A man and wife and their three children, who felt the grip of the cold after their furnace went out of order, were evacuated by the copter after three frigid days in their isolated farmhouse.

On-the-spot medical aid was administered in numerous cases by Lieutenant William Brown, Navy medical officer assigned to the naval unit here.

In addition to these more spectacular missions, the crew brought medical and food supplies to many civilian families as well as the NIKE units. Chief Warrant Officers John Greene and Howard Knight took turns at piloting and navigating the helicopter.

When Harford County Roads Commission asked for help in clearing the county's highways, five Army trained bulldozer operators were dispatched and they worked continuously for several days on a pair of Army 'dozers in helping to unsnarl roads in and around Bel Air, Md. One of their primary missions was to clear back roads for farmers so that badly needed milk could be taken to market.

Letters of appreciation signed by General Walmsley have gone out to post agencies and individuals who helped.

SCHOOL ADVISORY GROUP MEETS AT FT. McCLELLAN

Fort McClellan, Ala.—The School and Training Committee of the U. S. Army Chemical Corps Advisory Council met recently in the U. S. Army Chemical Corps School at Fort McClellan, Alabama.

The School Committee is concerned with such aspects of the Chemical Corps School activity as personnel and subject matter coverage; incorporation of recent Research and Development findings into courses; evaluation of extension course work; the effect of security policies on course content and teachings; and adequacy of the present manuals. The Chemical Corps is one of the first of the services to establish and use a committee of this type. Attending the first meeting were, Chairman Dr. John E. Vance, New York University; Dr. Frederick Bellinger, Engineering Experimental Station, Georgia Institute of Technology; Dr. James W. Duckett, The Citadel, Charleston, S. C.; Dr. Henry F. Harlow, University of Wisconsin; Dr. Walter E. Miller, City College of New York; and Colonel Lloyd E. Fellenz, commanding officer of the U. S. Army Chemical Warfare Laboratory, Army Chemical Center, Md.

Alternate members present were: Dr. James E. Greene, University of Georgia; Dr. Peter A. S. Smith, University of Michigan; and Dr. A. C. Weber, Massachusetts Institute of Technology.

Also in attendance were Dr. C. B. Marquand, Executive Director of the Advisory Council; and the Assistant to the Deputy Chief Chemical Officer for Scientific Activities, Lt. Colonel W. G. Willmann.

STANDARDIZATION SYMPOSIUM

Edgewood, Md.—A two-day symposium to review the Chemical Corps' standardization efforts and their impact on industry was held at the Engineering Command, Army Chemical Center, March 25-26.

Leaders of standardization in industry, representatives of Standardization Societies and military users discussed ways of expediting work to insure that industrial contracts are integrated into the Chemical Corps' decision-making at the right time and in the most efficient manner.

Among the scheduled speakers were: Mr. John J. Dunn, Staff Director for Standardization, Office of Production Policy, Office of the Assistant Secretary of Defense; Mr. J. G. Henderson, Union Carbide Chemicals Company; Mr. James Moran, Kimble Glass; Mr. Phil Callan, Eastman Kodak; Mr. Thomas M. Mints, Jr., Mr. E. H. Sargent, Mr. Ed Woerter, American Machine and Foundry; Mr. Ephraim Jacobs, Department of Justice; Mr. Sherman F. Booth, National Bureau of Standards; Mr. John C. Green, Technical Services, Department of Commerce; Mr. J. Q. Holmes, General Motors Technical Center; Admiral George Hussey (Ret.); and Mr. John L. van Arkel of the Engineering Command.

ANNOUNCE REORGANIZATION OF QUALITY ASSURANCE AGENCY

Edgewood, Md.—The United States Army Chemical Corps' Materiel Command at the Army Chemical Center recently announced the reorganization of the Quality Assurance Technical Agency here which is expected to result in a yearly saving to the government of more than $300,000.

The new streamlined organization is headed by Major J. Cronin, Jr., a former member of the Quality Assurance staff. It consists of a laboratory test division, a maintenance division, and a design division. The organization is responsible to design, maintain and test those inspection aids, tools and gauges, and equipment needed in the Chemical Corp's production program.

In the future, the Army Chemical Corps will primarily fabricate only those items of special equipment necessary for the use of prototypes. This means greater reliance will be placed on procurement of inspection equipment from commercial sources.

Additional monetary savings will be realized in the transfer of several internal functions from the Quality Assurance Technical Agency to other elements of the command already performing a similar function.

(Continued on page 35)

MR. ALEX SMALLBERG HONORED

Outstanding and Superior Performance Awards were presented recently to Mr. Alex Smallberg, Fort Detrick Procurement and Contracting Officer, by Colonel Donald G. Grothaus, Commanding Officer of the Chemical Corps Biological Warfare Laboratories. Mr. Smallberg, who is widely known throughout the Chemical Corps and industry, has been at Fort Detrick since October 1953. He formerly was chief negotiator, contracting officer, and deputy to the Commanding General, Research and Development Command, Army Chemical Center. Mr. Smallberg has a BA degree in Economics and a MBA in Accountancy.

MASTER SERGEANT KELLY IS HONORED ON HIS RETIREMENT

Master Sergeant Jesse P. Kelly holds Certificate of Acheivement presented to him by Brigadier General Harold Walmsley, commander of the Army Chemical Center, upon the eve of his retirement after rounding out

34 years in the Army—all in the Chemical Corps. Mrs. Kelly is an interested bystander. Sergeant Kelly enlisted as a private in the U. S. Army at Fort Slocum, New York, on Jaunary 14, 1920. With the exception of a four-year break in service, his Army career has been continuous. Overseas tours of duty were served in Panama, and in the Asiatic-Pacific Theater of Operations where he participated in the Guam, Marianas, Leyte and Mandate Islands Campaigns during the period April 1944 to August 1945. Among his decorations are the Asiatic-Pacific Campaign Medal with four Bronze Service Stars, Philippine Liberation Medal, and the Philippine Presidential Unit Citation.

MR. MILTON CUTLER PROMOTED

Mr. Milton Cutler (second from left), chief of the weapons research division, directorate of research, Chemical Warfare Laboratories, Army Chemical Center, is congratulated by Colonel Lloyd E. Fellenz (third from

left), commanding officer of the laboratories, upon his recent promotion to GS-15. Looking on are Dr. W. H. Summerson (left), director of research, and Dr. Rudolph Macy (right), technical adviser to the director of research. An alumnus of Brooklyn College in New York, Mr. Cutler has been with the Chemical Corps for 16 years, 12 at the Army Chemical Center.

DR. WILLS WINS FELLOWSHIP

Edgewood, Md. — Dr. Henry J. Wills, assistant chief of the Physiology Division, Directorate of Medical Research, Chemical Warfare Laboratories, Army Chemical Center, has been awarded a Research and Study Fellowship by Secretary of the Army Wilber M. Brucker.

He is one of the several career civilian scientists selected in the Army-wide competition to engage in one year of special research of vital concern to national defense.

Dr. Wills plans to conduct his studies in the field of anticholinesterates at California Medical School, Los Angeles; the National Institute of Medical Research, London, England; and the University of Utah. He also plans to visit several important medical centers in Europe.

Dr. Wills, a native of Richmond, Virginia, is an alumnus of Virginia Polytechnic Institute, has a master's degree from the Medical College of Virginia and doctorate from the University of Rochester.

SCOUT HONORS AWARDED BY EAGLE SCOUT, GEN. CREASY

Edgewood, Md.—Four members of the Edgewood Boy Scout Troop 369, all sons of military personnel, were elevated to the highest rank in Boy Scouting when they were awarded the Eagle Scout rank at a Court of Honor held here recently.

Major General William M. Creasy, Army Chief Chemical Officer, himself an Eagle Scout, addressed the candidates, parents, and several hundred spectators in the post gymnasium before he administered the Eagle Scout oath to Life Scouts David Dixon, Alan Lewis, Jim Richardson and Bill Roberts.

National and Troop colors of ten Scout units from Harford County and Baltimore were massed behind the stage to provide a beautiful setting for the ceremony. Included were Troop 313 from Bel Air, 521 from Baltimore, and local Explorer, Mariners, Brownies, Girl Scouts and Sea Scouts units.

INDUSTRIAL LIAISON PROGRAM

Both Industry and Chemical Corps benefit from scheme whereby information of discoveries by research groups is made available for possible military application.

ARMY CHEMICAL CENTER, Md.—At a time when maximum utilization of scientific knowledge is essential to national security one branch of the U.S. Army is carrying on a program, now six years old, whereby it receives the results of millions of dollars of industrial research at almost no cost to the taxpayers.

The Industrial Liaison Program of the U.S. Army Chemical Corps was developed for the purpose of collecting information and research data of military value in the field of chemical warfare from industries and universities. As a result of the program more than 2500 ideas, suggestions and compounds have poured into the Industrial Liaison Office at the U.S. Chemical Warfare Laboratories, Army Chemical Center, Maryland.

The program, originally suggested by Dr. S. D. Silver and Dr. R. Macy of the Army Chemical Warfare Laboratories as an economy measure, is based on the idea that very often in the course of research, private companies and universities come across compounds of potential military value either as by-products or as toxic intermediates in a multi-step process. In most cases these findings do not come to the attention of the Chemical Corps because they are discarded as of no practical or commercial value to the company.

It was felt that a formal program to enlist the aid and cooperation of private companies and universities would make available to the Chemical Corps, at no cost and for purely military application, the results of millions of dollars worth of private research and development. The program would also be useful in guiding the Corps' own research program so as to avoid duplicating the work already performed by others.

The Industrial Liaison Program was formally instituted in 1951 and at the time of the reorganization of the Army Chemical Corps in 1955-56, it was expanded to include, in addition to the toxic compounds, any idea, suggestion or compound of potential military value.

The program is currently headed by Dr. Edward A. Metcalf as Chief of the Industrial Liaison Office. He is assisted by Captain William Nelson.

At the present time Dr. Metcalf and Captain Nelson travel about 70,000 miles a year to talk to scientists about the problems of the Chemical Corps, and to add new contributors to the growing list of 350 companies, universities and independent laboratories which are providing valuable information to the Chemical Corps. It is hoped that the ILO will eventually be able to contact all of the 3,000 research laboratories in the country.

The Chemical Corps considers that in voluntarily contributing to the program, industry is reposing with it a trust which must be respected and the Corps goes to great lengths to protect the information against any compromise. In order to safeguard information and compounds which have been volunteered, the ILO has developed a security system which guarantees the secrecy of all contributions.

The system devised consists of three classifications. They are: "Commercial Discreet," which is given strict security and is seen by only a very small group of career Chemical Corps personnel on a strict "need-to-know" basis; "Commercial Discreet-Partial Release," which is the same as the first class except that the material is free to flow through military channels on a "need-to-know" basis; "Unclassified," which as no restrictions placed on the circulation of the material. Under none of the classifications is the name of the donor ever revealed to anyone outside the Industrial Liaison Office unless permission is granted by the donor. By assigning code numbers to the compounds it has been possible to limit the number of people who know the names of the donors to the four persons in the ILO. In the event that a donor does not request a specific classification, any information he makes available is automatically classified as "Commercial Discreet."

To further safeguard the interests of contributors, samples received by the Chemical Warfare Laboratories are subjected only to those tests for which they were requested and no attempt is made to synthesize the compound. After the tests are completed all notebooks are carefully put away and no scientific papers based on the tests are published.

When the ILO receives the report of the tests, all unclassified information is sent to the donor. Dr. Metcalf feels that by putting the cooperation on a two-way basis the ILO will assure the continuity and overall success of the program.

Both Dr. Metcalf and Captain Nelson are emphatic in stating that no information is considered valueless. If it does not fit into a current research program, it is filed for future reference in the Industrial Liaison Office. This material may represent a considerable future saving and there have been many instances in which a proposed research project has been cancelled when it was found that the ILO had the desired information in its files.

The Chemical Corps is interested in any information which will enable it better to carry out its mission. A partial list of the current interests of the Corps would include compounds which have a deleterious or lethal effect on animals or humans. In this category are toxic agents, special acting agents and materials which can be used for training or harassing purposes. Also desired are therapeutic comopunds such as as anti-convulsant agents and respiratory stimulants. In other fields the Chemical Corps is concerned with information involving gelling and incendiary materials.

MEDICAL RESEARCH BUILDING REDEDICATED IN CONFERENCE HONORING BRIG. GEN. J. R. WOOD

U. S. Army Photo

Seated: Dr. John R. Wood, Brigadier General, Medical Corps. (Ret.), Vice-President and Director of Research Burroughs Wellcome and Company, Tuckahoe, New York. Standing—left to right: Dr. James L. Whittenberger, James Stevens Simmons Professor of Public Health and Assistant Dean, Harvard School of Public Health; Colonel A. R. Dreisbach, MC, Director of Medical Research, U. S. Army Chemical Warfare Laboratories; Dr. Carl F. Schmidt, Professor of Pharmacology, University of Pennsylvania Medical School; Dr. R. Keith Cannan, Chairman, Division of Medical Sciences, National Academy of Sciences—National Research Council. Inset—Dr. David B. Dill, Deputy Director of Medical Research, U. S. Army Chemical Warfare Laboratories, who presided at Conference.

By V. A. Gordieyeff
Chief, Basic Toxicology Branch
U. S. Army Chemical Warfare Laboratories

AT THE HIGHEST point of the nation's war effort, on Washington's Birthday, 1944, a dedication ceremony took place on the marshland of the upper Chesapeake Bay in Harford County, Maryland. The building then dedicated is now known by the prosaic number 355 and houses laboratories of the Directorate of Medical Research, a part of the U. S. Army Chemical Warfare Laboratories at the Army Chemical Center, Maryland. Fourteen years ago, it officially opened its doors for the nucleus of the present organization, the freshly created infant Medical Division of the Chemical Warfare Service.

This original medical task force consisted of 10 officers and 24 civilians. The present Directorate of Medical Research counts now almost exactly ten times as many staff members: 345 men and women, 120 of whom are civilian employees of scientific or professional status. The military personnel counts over 30 officers and over 100 enlisted men (most of them in the enlisted specialist, i.e., soldier-scientist category.) The directorate is organized into four major research divisions of biophysics, clinical research, physiology, and toxicology. The research program covers a wide area of biological research problems including toxicology, pharmacology and mechanism of action of toxic agents, biological aspects of protection against toxic agents, respiratory physiology, study of environmental factors in physiological response to toxic agents, wound ballistics and body protection against wounding and burning action, and methods of prevention and therapy of casualties from toxic agents. The individual research tasks show an even wider spec-

trum of interests beginning with fundamental studies of physiological mechanism in simple organisms like insects and ending with final items of over-all practical importance like a mask-to-mask resuscitator for victims of nerve gas poisoning.

To commemorate the anniversary of the dedication of these laboratories for medical research, a conference on "Biological Explorations in the Field of Chemical Warfare" was held at the Army Chemical Center on February 21, 1958. In spite of inclement weather following one of the worst snow storms in the meteorological history of the Chesapeake region, a large number of distinguished guest scientists met with members of the staff of the Laboratories to discuss the past and current explorations and to take a long range look into the future of the biological research associated with toxicological warfare.

The guests were welcomed by Major General William M. Creasy, Chief Chemical Officer; Brigadier General Harold Walsmley, Post Commander; Colonel Lloyd E. Fellenz, Commanding Officer of the U. S. Army Chemical Warfare Laboratories; Colonel Albert R. Dreisbach, Director of Medical Research; Dr. David B. Dill, Deputy Director of Medical Research, who organized and presided over the conference, introduced the speakers and guests to the audience.

The conference was not limited exclusively to sober professional discussions: it also had a warmly human side. In its spirit, it was dedicated to honor the man whose foresight, hard and relentless effort, and perseverance led to the formation within the Chemical Corps of the nucleus of the present Medical Research Directorate—Brigadier General John R. Wood, U. S. Army Medical Corps (Retired). General Wood, who is now Vice-President and Director of Research for Burroughs Wellcome and Company, was the principal speaker in the morning session. He told of his activities at Edgewood as a Medical Corps officer during the hectic war years 1942-44 which led to the formation of the Medical Division within the framework of the chemical warfare program. His vivid account included some amusing experiences incident to acquiring scientific personnel, funds and facilities. The climax was an almost incredible achievement—he raised within one day, 1.5 million dollars to fund the erection of the medical research building.

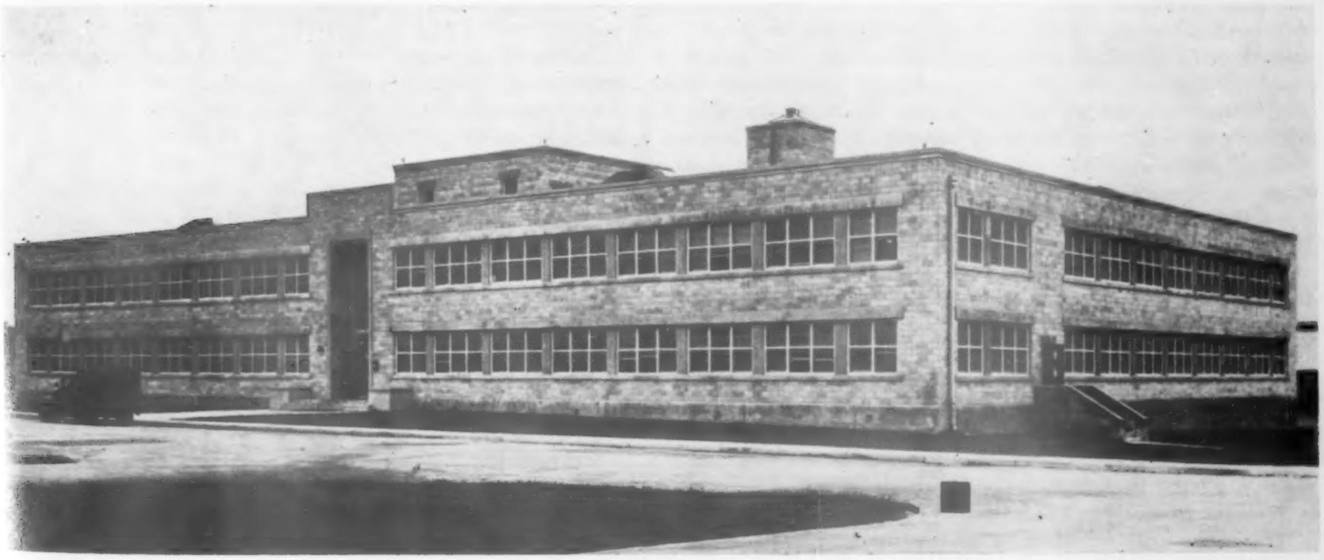
General Wood was followed by Dr. R. Keith Cannan, Chairman of the Division of Medical Sciences, National Academy of Sciences—National Research Council. Dr. Cannan reported and evaluated some of his activities in the field of chemical warfare research in which he was engaged by the Office of Scientific Research and Development (National Defense Research Council) during the war.

The afternoon session was devoted to reports on current physiological and biological exploration of interest to the biological program of chemical warfare research. Professor Carl F. Schmidt and Dr. George B. Koelle, both of the University of Pennsylvania School of Medicine and both Chemical Corps consultants, spoke about the present status of our knowledge of the mechanism of the cholinesterase enzyme inactivation by nerve gases and related compounds (Dr. Koelle) and of the fundamental effects of respiration on cerebral circulation (Dr. Schmidt). Professor James L. Whittenberger of the Harvard School of Public Health spoke on the advances in the field of respiratory physiology with special emphasis on physiological disturbances in the pulmonary mechanism caused by war gases. Dr. A. McGehee Harvey of the Department of Medicine, Johns Hopkins University, and also a member of the Advisory Council, told the audience about the latest studies carried out at the Johns Hopkins Hospital under a Chemical Corps contract, on the effect of the nerve agents on man, especially with respect to the mechanism of neuromuscular transmission.

The second part of the afternoon session was in the hands of four Branch Chiefs: Dr. Charles G. Wilber of the Physiology Division, Dr. Bernard P. McNamara of the Toxicology Division, Dr. Arthur J. Dziemian of the Biophysics Division and Dr. Kazuo K. Kimura of the Clinical Research Division. They outlined their ideas about future biological explorations in the field of chemical warfare. They discussed such topics as the search for a better understanding of the mechanism of toxic and incapacitationg action, physical factors in wound formation and wound protection, and research into new possibilities of toxicological attack opened by recent advances in pharmacology and medicine. Their ideas, expressed freely under the Chairmanship of Dr. J. H. Wills, Assistant Chief, Physiology Division, stimulated members of the audience as was evidenced by a spirited discussion.

In addition to the conference, two other events had been arranged. Mrs. Wood was honored at a luncheon by Mrs. D. B. Dill attended by several of Mrs. Wood's friends, including Mrs. William M. Creasy. An informal

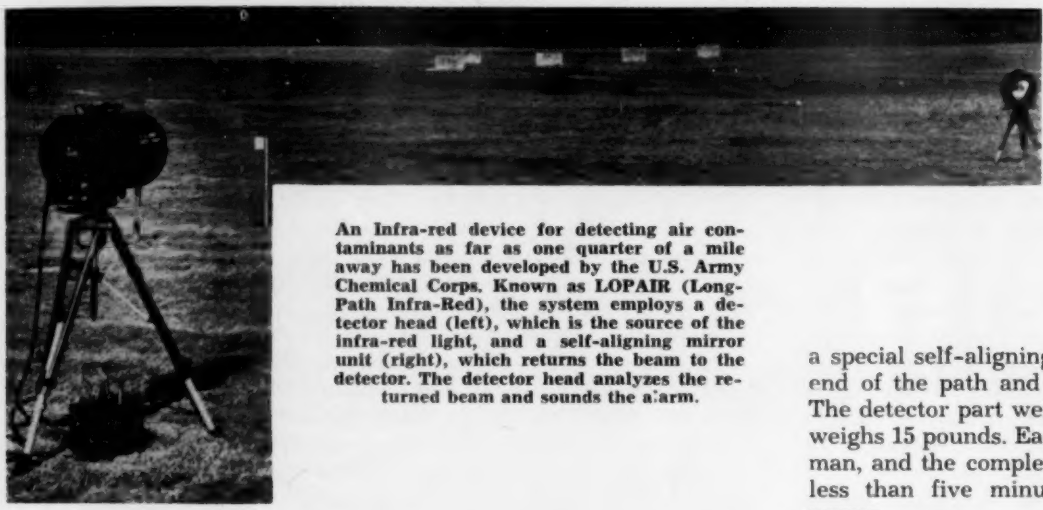
(Continued on page 36)



SCIENCE AND TECHNOLOGY DEPARTMENT

LOPAIR

NEW CHEMICAL WARFARE ALARM USES INFRA-RED



An Infra-red device for detecting air contaminants as far as one quarter of a mile away has been developed by the U.S. Army Chemical Corps. Known as LOPAIR (Long-Path Infra-Red), the system employs a detector head (left), which is the source of the infra-red light, and a self-aligning mirror unit (right), which returns the beam to the detector. The detector head analyzes the returned beam and sounds the alarm.

An infra-red "eye," so sensitive that it will detect evaporation from one droplet the size of a pinhead in an average living room, has been developed by the U. S. Army Chemical Corps and the Farrand Optical Company as a new protective device against chemical warfare agents.

Intended for use by troops in the field, the new device, known as LOPAIR (for long-path infra-red), will flash a warning light and sound a horn when a tiny amount of contaminant in the air as far as one-quarter of a mile away from the "detector head" crosses an invisible infra-red beam. LOPAIR will detect contaminants even if they are colorless and invisible to the naked eye, as most potential toxic warfare agents are. In combat, it would warn soldiers to put on their protective masks.

LOPAIR can also be used in air pollution studies and industrial establishments, according to Mr. Harvey Tennenbaum, one of the group of scientists in the U. S. Army Chemical Warfare Laboratories who developed the device.

The current model of the alarm consists of two separate parts. One unit, called the "detector head," which is mounted on a tripod, contains the source of infra-red light, a mirror that directs the beam along the path, and a detector to analyze the beam when it returns.

The other unit, which may be mounted on a tripod, is a special self-aligning mirror that is placed at the other end of the path and returns the beam to the detector. The detector part weighs 39 pounds and the mirror unit weighs 15 pounds. Each unit can be carried easily by one man, and the complete alarm can be set in operation in less than five minutes. Storage batteries supply the power.

The system can detect and measure almost any substance by its characteristic infra-red spectrum. Once the alarm has been properly set to detect one specific substance, however, it will normally not be set off by other materials likely to be present. A special design feature also prevents the alarm from sounding even though a person, animal or vehicle breaks the beam between the two units.

LOPAIR is based on the more familiar and delicate laboratory instrument, the infra-red spectrometer, which was adapted for use in the field. The detector unit was made more rugged, and a system of mirrors was developed so that the entire ¼-mile distance in the field acts as the sampling cell. The alarm is not yet available for troop use, since final tests must still be made.

The LOPAIR principle is also being adapted to other designs for special purposes. A more powerful unit being developed for the Air Force will have a range of 3 to 5 miles. It is intended for permanent installation at air bases. Another system is being studied for possible use either on land or sea. This design is termed a "passive" system and will use naturally-occurring infra-red rays instead of an artificial source.

Primarily responsible for the development were personnel of the Alarms Branch of the U. S. Army Chemical Warfare Laboratories and the Farrand Optical Co., Inc., New York, N. Y. under Government contract.

A NEW GASEOUS DISINFECTANT DISCOVERED BY DETRICK GROUP ANNOUNCED BY DR. C. R. PHILLIPS

JERSEY CITY, N. J.—Discovery of a new bactericidal gas by a team of Chemical Corps scientists was announced here on Feb. 25, 1958, by C. R. Phillips, Ph.D., chief, physical defense division, U. S. Army Chemical Corps, Fort Detrick, Md.

The new gas is a beta-propiolactone—a compound which is believed to have been used previously for sterilization only in aqueous solution. As a gas it acts as effectively as formaldehyde vapor but works more rapidly and with fewer adverse side effects.

Dr. Phillips predicted that a few years study will prove the gas to have "important applications" with possible use "in sterilizing operating rooms, nurseries within hospitals, and the like."

Dr. Phillips announced this new use of beta-propiolactone in a paper of "Gaseous Sterilization" delivered at Seton College of Medicine and Dentistry as part of the Becton, Dickinson Lectures—a series on sterilization techniques sponsored by the medical supply firm and the college.

Work on the new gas has been done by Dr. Phillips' colleagues Robert Hoffman and Benjamin Warshowsky at the Chemical Corps laboratory at Fort Detrick, Frederick, Md. Dr. Phillips reported that beta-propiolactone has been used effectively there to disinfect entire buildings. For details concerning this gas he suggested his audience wait for a paper on the subject by Hoffman and Warshowsky which, he said, was then in the press.

Explaining the Chemical Corps interest in gas sterilization research, Dr. Phillips said, "During World War II when the possibility of biological warfare had to be considered, a small group was set up to consider how BW decontamination could be accomplished in case BW was used against us. . . . Of all procedures which were in common use at that time, that of gaseous sterilization seemed most adaptable . . . gaseous sterilization amounts to applying chemical warfare techniques against our disease-causing enemies."

—Fabian Bachrach

Dr. Charles R. Phillips, Chief of the Physical Defense Division, Army Chemical Corps Biological Warfare Laboratories, Fort Detrick, Frederick, Md., was born in 1912 in Blackville, South Carolina. He has a Bachelor of Science Degree in Chemistry from Clemson College and Master of Science and Doctor of Philosophy Degrees in Chemistry from Pennsylvania State University.

During World War II Dr. Phillips served as an enlisted man at Camp Sibert, Army Chemical Center, and at Fort Detrick. In 1946, he returned to Fort Detrick as a civilian employee. He served first as Chief of the Decontamination Branch, Physical Defense Division; later, as Chief of that Division.

Army laboratory worker, garbed in protective clothing, takes a sample in a warehouse treated with decontaminant to check sterilization. The protective suit is necessary due to gaseous sterilant still in the air. Work such as this is described by Dr. C. R. Phillips, of U. S. Army Chemical Corps, in a speech at Jersey City, N.J., Feb. 25, 1958.

Dr. Phillips' paper surveyed the field of gaseous sterilization, reviewing the early work with formaldehyde and the more recent development of ethylene oxide mixtures. On formaldehyde gas he concluded, "that formaldehyde gas did have many practical applications, particularly in treating large and relavely uncluttered enclosed spaces . . ." but that since it "is really not acting as a gas . . . rather travelling through the air in a gaseous form and condensing out on all readily available surfaces" with "only exposed outer surfaces . . . sterilized by this treatment" it was "unsatisfactory for . . . materials and objects such as woolen uniforms and potentiometers which should really be sterilized in the absolute sense of the term."

Turning to ethylene oxide, Dr. Phillips explained how the fire hazard had been overcome by mixing this highly flammable gas with carbon dioxide and flourinated hydrocarbons (Freons). Summarizing its characteristics he reported that ethylene oxide damages few materials; that it is "truly bactericidal and not bacteriostatic in effect;" and "that the list of organisms reported killed by ethylene oxide is impressive." He also stated that since it "is a true gas which does not polymerize or absorb on most materials, . . . simple airing quickly removes all residual chemicals from most objects."

(Continued on page 36)

A. F. C. A. AFFAIRS

A.F.C.A. TO PLACE WREATHS IN HONOR OF UNKNOWN WAR DEAD

The Armed Forces Chemical Association will place wreaths at the biers of Unknowns of World War II and the Korean Conflict, during ceremonies honoring the unknown war dead, at the rotunda of the Capitol, Washington, D.C., on Armed Forces Day, May 17. The Military District of Washington is in charge of arrangements for the program.

VICE PRESIDENT NORMAN IS NOW PARTNER IN SECURITIES FIRM

Col. Robert T. Norman, Vice-President of A.F.C.A. and chairman of its Finance Committee, recently was made a general partner in the securities firm of Auchincloss, Parker & Redpath, Washington, D.C. Mr. Norman, a reserve officer of the Army Chemical Corps, in which branch he served in World War II, is a native of Washington, D.C., and a graduate of Virginia Military Institute. He joined the Auchincloss, Parker & Redpath firm in 1952.

BRIG. GEN. WALMSLEY SPEAKS AT CINCINNATI GATHERING

"The Role of Chemistry in the National Defense" was the subject of an address by Brigadier General Harold Walmsley, Commander Army Chemical Center, Maryland, who was guest speaker at a dinner sponsored by the Cincinnati Chapter, A.F.C.A., and the Cincinnati Section of the American Chemical Society in Cincinnati, on April 9, 1958.

MONSANTO CO. PLANT MANAGER ADDRESSES McCLELLAN CHAPTER

Mr. Des Hosmer, manager of the Anniston, Alabama, Monsanto Chemical Company plant, was guest speaker at the monthly meeting of the Fort McClellan Chapter of the Armed Forces Chemical Association March 10. Mr. Hosmer's talk was entitled "Anniston Alabama's Case for Air Service."

Delegates-at-large to the annual meeting of the National Association, June 5-6 in Atlantic City, were elected at the dinner meeting, which was held at the Ft. McClellan Officers' Club. Col. J. M. Palmer, Mr. Richard Kneisel, and Mr. Bennie Ledbetter were the delegates selected. Col. Marvin Middlebrooks, president of the local chapter, presided at the meeting. Guests included Dr. Per Frolich, Brig. Gen. Don C. Faith (retired), Col. Frank Arthur, Mr. Edgar Crumb, Mr. Duane Rolpke, Mr. Raymond Randall, and Mr. Walter Fackler. The guests are attending the Management Course at the U.S. Chemical Corps School at Ft. McClellan.

FT. DETRICK CHAPTER HEARS TALK BY MR. ROSS P. POPE

FORT DETRICK, FREDERICK, MD.—Mr. Ross P. Pope (center), staff investigator for the Committee on Appropriations, House of Representatives, Washington, D.C., is shown in picture above being greeted by Colonel Leslie S. Moore, Deputy Commander, Fort Detrick, Frederick, Md.

Mr. Pope addressed the A.F.C.A.'s Fort Detrick Chapter recently on the subject, "A Visit to Eastern Europe." Colonel Moore is president of the Chapter. Mr. James A. Kime (right), of the Fort Detrick research staff, is Secretary-Treasurer.

EXECUTIVE COMMITTEE ACTS IN MEMORY OF LATE GEN. BULLENE

The Executive Committee of A.F.C.A. dedicated the closing of its regular monthly meeting in Washington, D.C., on February 24, to the memory of Major General Egbert F. Bullene, U.S.A., Retired, former Chief Chemical Officer of the Army, who died in San Francisco, Calif., on February 21, 1958. The Association sent flowers for the funeral of General Bullene, a Past Honorary President of A.F.C.A., at The Presidio of California, San Francisco, on February 25.

"FUEL AND POWER" IS SUBJECT AT WILMINGTON CHAPTER DINNER

Wilmington Chapter, Armed Forces Chemical Association held a dinner meeting in the Tack Room of the Hunter Restaurant on Wednesday, February 26, 1958. Mr. H. T. Clark, President, presided. A total of 25 attended, including 19 members and 6 guests.

After the minutes of the November meeting had been read, a report was given by Mr. Wendell Jackson on progress of plans for the national meeting scheduled for Atlantic City June 5 and 6.

Dr. Kinsinger introduced the speaker for the evening, Capt. Charles H. Mead, USN, of the Industrial College of the Armed Forces, Washington, D.C. Captain Mead told of the organization and activities of the Industrial College and of its series of National Resources conferences, including the one recently held in Philadelphia.

Captain Mead's very informative address, entitle

"Fuel and Power," dealt with energy resources of coal, gas, oil, and water power in comparison with world resources. He concluded with brief remarks on the newer energy sources—nuclear fission and solar energy.

CHAPTERS TO SEND STUDENTS TO BOSTON DURING NATO PROGRAM

EDGEWOOD, MD.—When NATO's Atlantic Treaty Association meets in Boston this fall, six Edgewood High School students will attend as guests of the Army Chemical Center and New England chapters, Armed Forces Chemical Association.

Students will be selected by a group of citizens of this community who will serve as final judges for a school essay contest on the subject, "What NATO Means to Me." The contest is open to all Edgewood High School sophomores and juniors. It closes on May 16, and winners are to be announced shortly thereafter.

Colonel William J. Allen, Jr., president of the Army Chemical Center chapter, A.F.C.A., heads a committee of military, civic, school and community representatives on this joint project.

The September meeting of this civilian arm of NATO will mark the first meeting of this group in the United States. They previously met in Paris, London and Rome.

According to information received from Mr. Harry A. Wansker, President of the Boston Regional Conference on NATO Affairs, a partial list of the dignitaries expected to attend the conference includes Mr. Frank Pace, former Secretary of the Army; Admiral Jerauld Wright, Supreme Allied Commander, Atlantic; the Honorable Christian Herter, Under Secretary of State; Mr. Paul Henri Spaak, NATO Secretary General; former Canadian Premier for International Affairs, Mr. Lester B. Pearson; and representatives of the fourteen participating member NATO nations.

Contest winners will travel to Boston by private automobile with chaperones and will live at the home of a Boston family. There will be tours of historic sites and attendance at some phases of the NATO conference. On the final evening the visitors will be guests at a banquet.

MIDWEST MEETING PLANS THE ROLE OF CHEMISTRY

Midwest Chapter's March issue of the "Detonator," its monthly newsletter, told of plans for the annual meeting of the Chapter to be held late in April. Scheduled speakers were Dr. Schultz who addressed the Chapter on Russia last Spring, and Past-President Mort Hague with a story of African travel this year. Plans were also being considered for a one-day Chicago River-Lake Michigan cruise late this Spring.

CHEMISTS HONOR DR. READ

Dr. William T. Read, a member of Washington Chapter, A.F.C.A., who recently retired as chemical consultant to the Department of the Army, received this year's honor award from the Washington Chapter of the American Institute of Chemists, for "outstanding contributions to the chemical profession" as teacher, author, and civilian scientist. Doctor Read is very active in promoting interest of young people in the Washington school area in science through the medium of science fairs.

A native of Texas, he received his A.B. degree from Austin College and his Ph.D. from Yale.

CHEMICAL CORPS NEWS

(Continued from page 27)

AWARDS AND COMMENDATIONS

In recent ceremonies in his office, Major General William M. Creasy, Chief Chemical Officer, presented awards in the Civilian Incentive Awards program, as follows:

Meritorious Civilian Service Awards to Mr. Kenneth L. Calder and Mr. John L. Converse, of Ft. Detrick, Md.

Sustained Superior Performance Awards to Mrs. Nancy C. Ege (and $200 cash), Miss E. Jane Fishback (and $100 cash), and Mrs. Clara E. Baughman (and $100 cash), all of Logistics Planning Division of his office; and Mr. Richard F. Read (and $200 cash), of Office of the Comptroller, Office of Chief Chemical Officer.

In another Civilian Incentive Awards ceremony, Col. Graydon C. Essman, Commanding Officer, R&D Command, OCCm10, presented five awards as follows:

Sustained Superior Performance Awards to—Dr. John L. Schwab (and $300 cash); Mr. Louis Benjamin (and $300 cash); Mr. John Haje (and $200 cash); Mrs. Gladys P. Silber (and $200 cash), and Mr. S. Richard Walton (and $300 cash).

COLONEL BABCOCK IS ASSIGNED TO LOGISTICS POST IN EUROPE

Colonel Jack E. Babcock, Chemical Corps, has been assigned to Headquarters Allied Forces Central Europe. As Chief of the Logistics Planning Division in that command, he will have staff responsibility for joint logistics planning for the land, sea, and air forces of central Europe.

Colonel Babcock is a graduate of the Chemical Corps School, Command and General Staff College, the Industrial College of the Armed Forces, and NATO Defense College. He received a Bachelor of Science degree at the University of Washington in Seattle in 1937, and was graduated from Georgetown University with the degree of Doctor of Philosophy in 1954. He is a co-author of "Emergency Management of the National Economy," 6 Volumes, G.P.O. 1950, and: "The Evolution of Industrial Mobilization Planning in the United States, 1920-1945." GU, 1954.

NEW UNIT FORMED FROM INACTIVATED COMPANIES

Fort McClellan, Ala. — Ceremonies were recently held at the 100th Chemical Group (ComZ) to inactivate two chemical companies. Troops manning these companies formed a new unit, the First Chemical Company (Combat Support). The inactivated companies were the 8th Chemical Company, (Field Depot), organized March 13, 1942 at Schofield Barracks, Ft. Shafter, Hawaii; the 30th Chemical Company (Decontamination) organized January 14, 1942, at Camp Bowie, Texas. Both companies had outstanding records.

The First Platoon of the 30th received the Distinguished Unit Citation and the French Croix de Guerre with Silver Star for service in the landing on the Normandy Beachhead, in World War II.

NEW GASEOUS DISINFECTANT

(Continued from page 33)

He listed penicillin and other biologicals, hospital bedding, opthalmic, urological and other types of medical instruments, eggs (through the shell), whole barrels of spice and even artery sections used for surgical transplants as examples of the great variety of articles reported sterilizable by ethylene oxide.

As disadvantages of ethylene oxide he noted its slowness of action (at room temperatures and in the usual concentrations reached within a cabinet, six hours or more are often required); that in rubber and certain plastics it actually dissolves and then evaporates slowly; and that is can damage some plastics if due to engineering difficulties the gas converts to its liquid state.

He concluded, however, "The very fact that with this gas we can sterilize many objects or materials hitherto unsterilizable, places the disadvantages of ethylene oxide into the category of unavoidable nuisances which we have to tolerate in order to do certain jobs we can accomplish by no other means known today."

Discussing the theory of why these gases—formaldehyde, ethylene oxide and beta-propiolactone—actually kill germs, Dr. Phillips explained that they all "undergo what we call alkylation reactions with suitable organic chemicals. It is this type of reaction which we believe occurs with the reactive groups within the complex enzyme and proteins in the bacterial cells. These complex protein compounds can then no longer be effective in the necessary vital process of cell metabolism."

Dr. Phillips' lecture was attended by doctors, nurses, medical students, laboratory workers, military and hospital personnel, and members of allied sciences.

The Becton, Dickinson Lectures on the techniques of sterilizing medical and surgical equipment were established under a public service grant from Becton, Dickinson and Company of Rutherford, N. J., manufacturer of medical equipment.

FOOD IRRADIATION AT DUGWAY PROVING GROUND

DUGWAY, Proving Ground, Utah — Round-the-clock operations are under way at the Army Chemical Corps Irradiation Facility at Dugway Proving Ground, Utah, where the foods for the Army Quartermaster Corps' Fort Lee troop tests are being processed.

Dugway has been in the food irradiation business since 1954 when the Quartermaster Corps program began in earnest. It is the only Army-controlled gamma facility available to the Department of the Army today for high dose studies. In the past three years of operation, the Radiological Division at this Chemical Corps installation in Utah handled over 100 tons of food samples, delivering an average dose of one million roentgen to each sample.

Research has shown that gamma irradiation of foods and food products improves the storage qualities of many foods without introducing health hazards.

With the Fort Lee acceptability tests being the first large scale attempt to introduce irradiated food to humans, every added precaution has been taken to insure that the items to be fed are not only tasty and nutritionally adequate, but safe. For this reason each sample container is tagged with two special dosimeters throughout its processing and a complete "history" of each item is maintained from the time of first pack until the meal actually appears on the table at Fort Lee.

Selection of Dugway for the irradiation work to support the Fort Lee tests is based on the accuracy with which the Chemical Corps facility is able to deliver the precise dose of radiation on order. Accuracy of within three per cent of true value has been achieved at Dugway.

Satisfactory completion of the Fort Lee tests is expected to stimulate even greater interest in this joint effort by the Quartermaster Corps, Chemical Corps and the Surgeon General's Office to provide a sound and tasty menu for the Pentomic G. I.

MEDICAL BUILDING REDEDICATED

(Continued from page 29)

testimonial dinner was held in the Gunpowder Officers' Open Mess of the Center at the close of the day in honor of General Wood and Mrs. Wood. The dinner was attended by about 70 friends of General Wood, most of whom were associated with him during his pioneering days in Edgewood. Chemical Corps representatives including General Creasy and General Walmsley took this opportunity to express their appreciation of the services of General Wood to the Chemical Corps and its mission. Dr. Dill, in calling on General Wood, voiced for all those present, the high regard held for him as a scientist and as an administrator and the warm affection felt for both General and Mrs. Wood. In response, General Wood recalled some adventurous days during his seven and one-half years at the Army Chemical Center. He expressed feelingly for Mrs. Wood and himself, their pleasure in meeting old friends and their deep appreciation of having been honor guests at this home-coming celebration.

DR. WHITTENBERGER, PROFESSOR OF PUBLIC HEALTH AT HARVARD

EDGEWOOD, MD.—Dr. James L. Whittenberger, an authority in the physiology of respiration, has been named the first James Stevens Simmons Professor of Public Health in the Harvard University of Public Health.

Dr. Whittenberger nas nad a long association with the Chemical Corps through the Medical Division and later Medical Directorate of the Chemical Warfare Laboratories at Army Chemical Center and as consultant and member of the Chemical Corps Advisory Council.

Dr. Whittenberger is a specialist in problems of respiration and has devoted a great deal of time to research in the fields of artificial respiration.

MRS. INEZ M. PACE, SCHOOL EDITOR WINS CERTIFICATE

The publications editor at the U. S. Army Chemical Corps School, Mrs. Inez M. Pace, recently, on her completion of 15 years in civil service work, was awarded a Certificate of Achievement.

Mrs. Pace's work was instrumental in the production of manuals used to train troops during World War II and the Korean conflict.

She was cited for her "knowledge of Chemical Corps activities and equipment; diligence in insuring clear and accurate presentation in training literature and her spirit of friendly cooperation."